# Mini System FW363/21M/22/34

Service
Service
Service

# Service Manual

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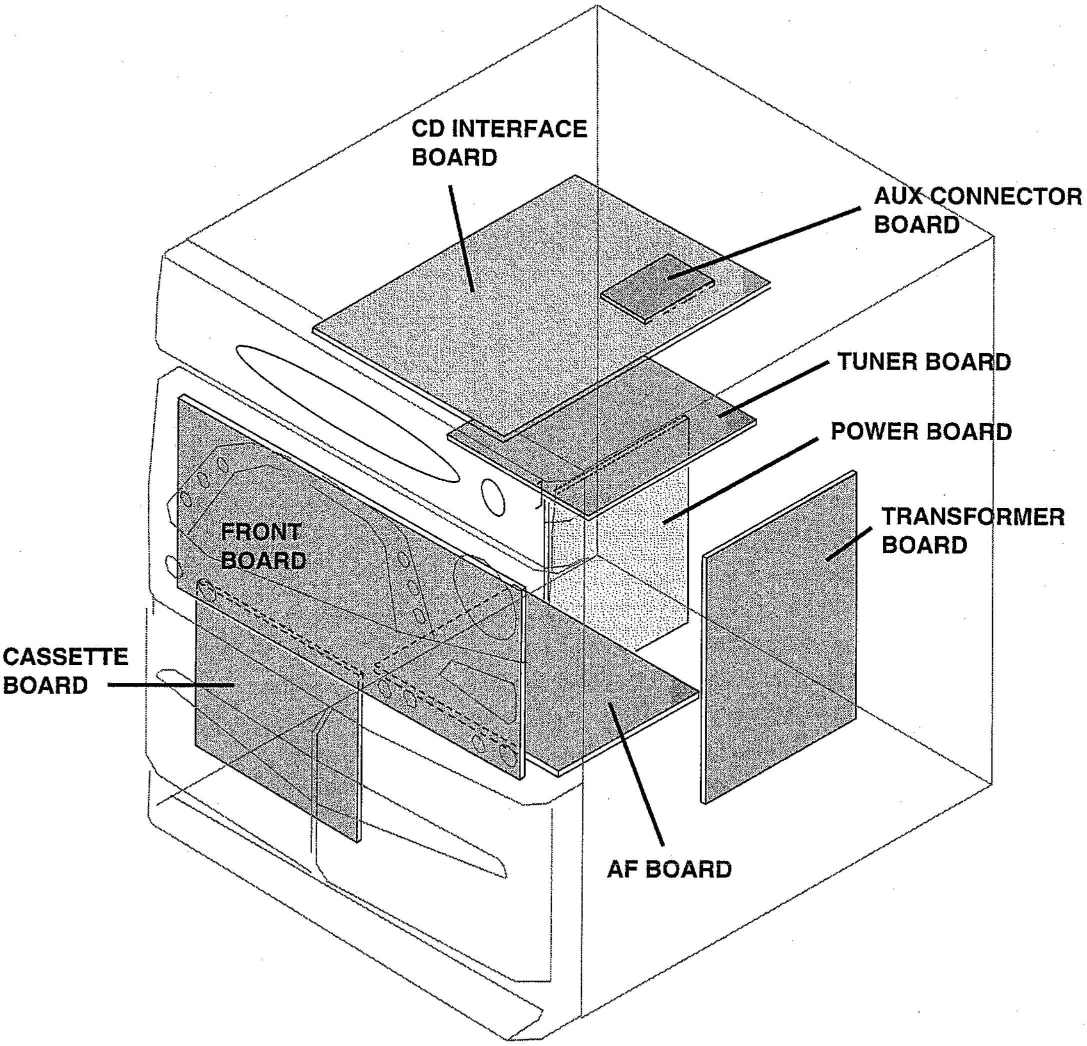
PCS 96 629A

PHILIPS

## LOCATION OF PRINTED CIRCUIT BOARDS


CD INTERFACE BOARD
AUX CONNECTOR BOARD
TUNER BOARD
POWER BOARD
TRANSFORMER BOARD
FRONT BOARD
CASSETTE BOARD
AF BOARD

## TECHNICAL SPECIFICATION

### *General:*

| | |
|---|---|
| Mains voltage | : 120V - 230V -/21<br>230V -/22<br>230V -/34 |
| Mains frequency | : 50 - 60Hz |
| Power consumption | : 37W max. @1/8 Prated |

### *Amplifier:*

| | |
|---|---|
| Output power | : 2 x 18W at 3Ω |
| Headphone | : 3.5mm stereo jack |
| Frequency response | : 40Hz - 20kHz (-3dB) Limit |
| Dynamic bass boost | : 11.5dB ±2dB at 60Hz |

Input sensitivity

| | |
|---|---|
| Aux/Line | : 400mV ±2dB |
| Microphone | : 2.5mV ±2dB @ 1kHz |

### *Equalizer:*

| | |
|---|---|
| 80Hz | : -4 ~ 6.5dB |
| 1 KHz | : ± 3.5dB |
| 10kHz | : -1.8 ~ 5dB |

### *Tuner:*

*FM*

| | |
|---|---|
| Tuning range | : 87.5MHz-108MHz |
| Grid | : 100kHz |
| IF | : 10.7MHz |
| Sensitivity Mono 26dB S/N | : < 7µV |
| Distortion at RF=1mV, _f=75kHz | : 3% {1%} |
| IF rejection | : > 60dB |
| Image rejection | : > 25dB |
| -3dB Limiting Point | : <23.5dBf {22dBf} |

*MW*

| | |
|---|---|
| Tuning range | : 530kHz - 1700kHz<br>{531 - 1602kHz}<br>531kHz - 1062kHz |
| Grid | : 10kHz |
| IF | : 450kHz ± 1kHz |
| Sensitivity at 26dB S/N | : < 4.0mV/M |
| Distortion at RF=50mV, m=80%) | : < 5% {3%} |
| IF rejection | : > 45dB |
| Image rejection | : > 28dB |

*LW*

| | |
|---|---|
| Tuning range | : 153kHz-279kHz |
| Sensitivity at 26dB S/N | : < 6.0mV/M |
| IF rejection | : > 26dB |
| Image rejection | : > 28dB {35dB} |

### *CD Unit:*

| | |
|---|---|
| Frequency response within | : 20Hz - 20kHz at ±3dB |
| Signal/Noise ratio | : > 86dB (A-weighted) |
| Channel unbalance | : < 1dB |
| Channel separation at 1kHz | : > 45dB |
| De-emphasis | : 0 or 15/50 µS |

### *Recorder Part:*

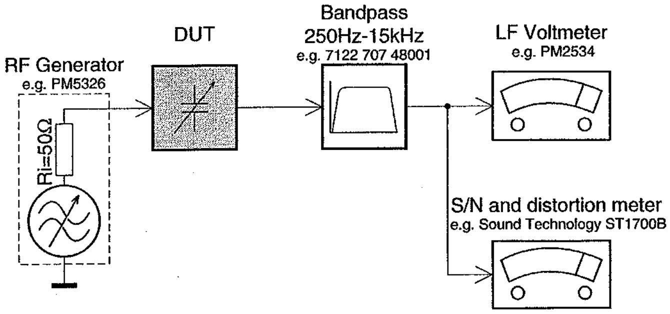
| | |
|---|---|
| Tape speed | : 4.76 cm/sec ±2% |
| Wow and flutter | : < 0.2% |
| Fast-wind time C60 | : 130 sec |
| Bias system AM/FM | : AC 75kHz ± 5kHz |
| Distortion at 200nWb/m | : < 5% |
| Channel difference at PB | : < 3dB |
| Channel difference overall | : < 3dB |
| Channel Separation | : > 24dB at 1kHz |
| Track Separation | : > 55dB at 1kHz |
| ALC attack time | : < 10ms |
| ALC recovery time | : > 60s |
| Frequency Response | : 80Hz - 12.5kHz within - 8dB |
| Signal to noise ratio ① | : > 43dB |
| Signal to Hiss ratio ② | : > 48dB |
| Erase attenuation ③ | : > 55dB at 1kHz |

① at 250 nW/m FF-weighted (22Hz-22kHz band pass filter)
② at 250 nW/m A-weighted
③ use a 1kHz passfilter to minimize the wide band noise component

Note: {....} for version 22 only

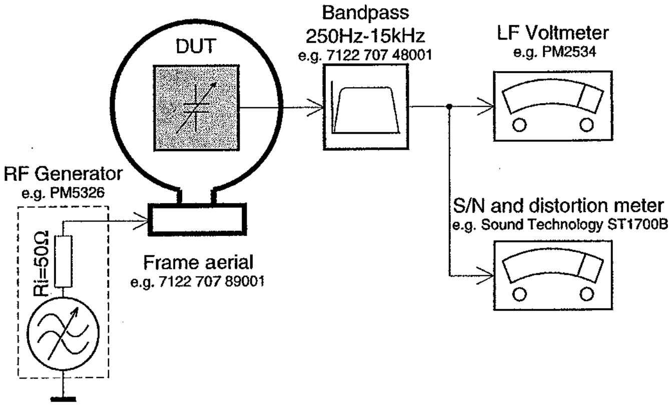
# MEASUREMENT SETUP

## *Tuner FM*


DUT
Bandpass
250Hz-15kHz
e.g. 7122 707 48001
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
S/N and distortion meter
e.g. Sound Technology ST1700B

Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

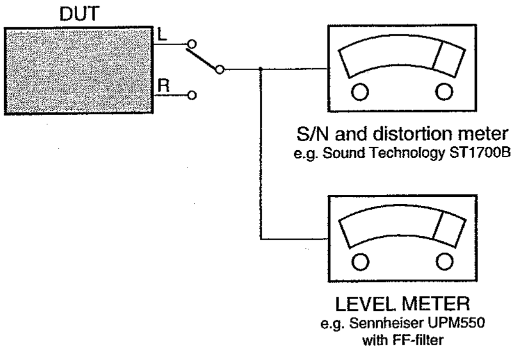
## *Tuner AM (MW,LW)*


DUT
Bandpass
250Hz-15kHz
e.g. 7122 707 48001
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
Frame aerial
e.g. 7122 707 89001
S/N and distortion meter
e.g. Sound Technology ST1700B

To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

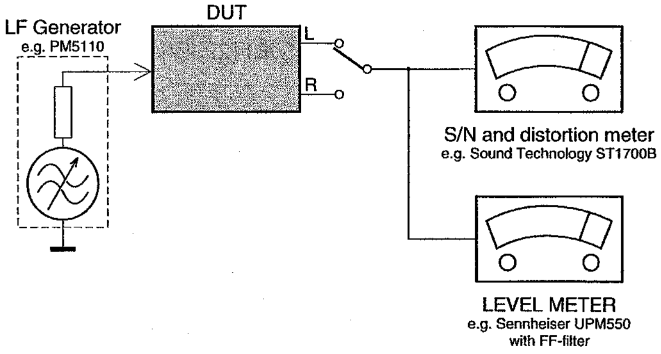
## *CD*

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)


DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

## *Recorder*

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071


LF Generator
e.g. PM5110
DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

# SERVICE AIDS

**Service Tools:**

| | |
|---|---|
| Universal Torx driver holder | 4822 395 91019 |
| Torx bit T10 150mm | 4822 395 50456 |
| Torx driver set T6 - T20 | 4822 395 50145 |
| Torx driver T10 extended | 4822 395 50423 |

**Cassette:**

| | |
|---|---|
| SBC419 Test cassette CrO2 | 4822 397 30069 |
| SBC420 Test cassette Fe | 4822 397 30071 |
| MTT150 Dolby level 200nWb/M | 4822 397 30271 |

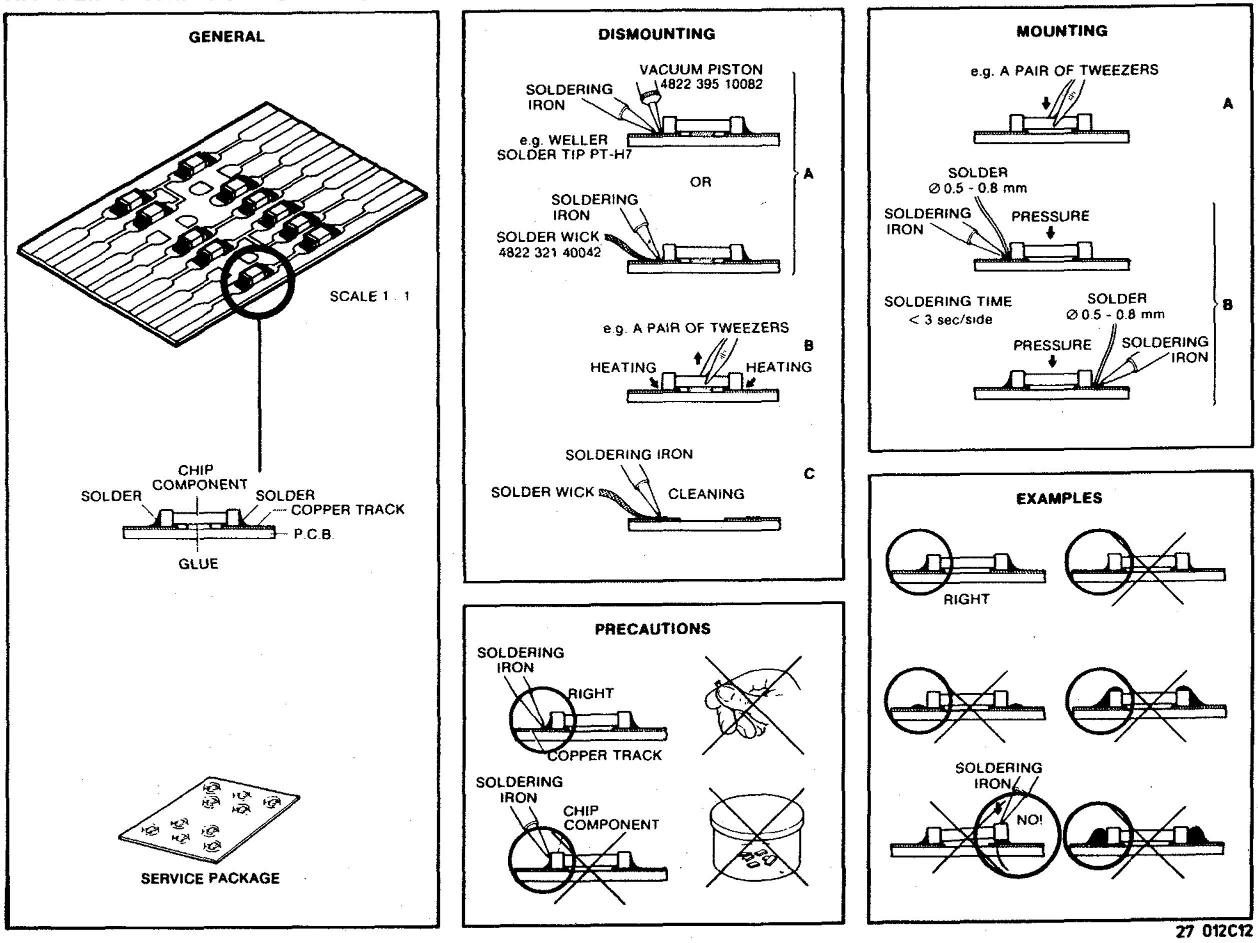
**Compact Disc:**

| | |
|---|---|
| SBC426/426A Test disc 5 + 5A | 4822 397 30096 |
| SBC442 Audio Burn-in Test disc 1kHz | 4822 397 30155 |
| SBC429 Audio Signals disc | 4822 397 30184 |
| Dolby Pro-logic Test Disc | 4822 395 10216 |

**ESD Equipment:**

| | |
|---|---|
| Anti-static table mat - large 1200x650x1.25mm | 4822 466 10953 |
| Anti-static table mat - small 600x650x1.25mm | 4822 466 10958 |
| Anti-static wristband | 4822 395 10223 |
| Connector box (1MΩ) | 4822 320 11307 |
| Extension cable<br>(to connect wristband to conn. box) | 4822 320 11305 |
| Connecting cable<br>(to connect table mat to conn. box) | 4822 320 11306 |
| Earth cable (to connect product to mat or box) | 4822 320 11308 |
| Complete kit ESD3<br>(combining all above products) | 4822 320 10671 |
| Wristband tester | 4822 344 13999 |

## HANDLING CHIP COMPONENTS


GENERAL
SCALE 1 : 1
CHIP COMPONENT
SOLDER
SOLDER
COPPER TRACK
P.C.B.
GLUE
SERVICE PACKAGE
DISMOUNTING
VACUUM PISTON 4822 395 10082
SOLDERING IRON
e.g. WELLER SOLDER TIP PT-H7
OR
A
SOLDERING IRON
SOLDER WICK 4822 321 40042
e.g. A PAIR OF TWEEZERS
B
HEATING
HEATING
SOLDERING IRON
C
SOLDER WICK
CLEANING
MOUNTING
e.g. A PAIR OF TWEEZERS
A
SOLDER Ø 0.5 - 0.8 mm
SOLDERING IRON
PRESSURE
SOLDERING TIME < 3 sec/side
SOLDER Ø 0.5 - 0.8 mm
B
PRESSURE
SOLDERING IRON
PRECAUTIONS
SOLDERING IRON
RIGHT
COPPER TRACK
SOLDERING IRON
CHIP COMPONENT
EXAMPLES
RIGHT
SOLDERING IRON
NO!

27 012C12

### (GB) WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

### (F) ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

## ESD

### (D) WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

### (NL) WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

### (I) AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB)

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used.

(NL)

Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

(F)

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utiliséés les piéces de rechange identiques à celles spécifiées.

(D)

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Original zustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

(I)

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

"After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA."

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

**CLASS 1**
**LASER PRODUCT**
3122 110 03420

### (GB) Warning !

Invisible laser radiation when open.
Avoid direct exposure to beam.

### (S) Varning !

Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

### (SF) Varoitus !

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen!

### (DK) Advarse !

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

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**Timer Setting** ......................................... 17
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## General Information

- The typeplate is located at the rear of the set.
- Recording is permissible if copyright or other rights of third parties are not infringed.

1 All unnecessary packaging material has been omitted. We have tried to make the packaging easy to separate into three mono-materials:
   - cardboard (box)
   - expandable polystyrene (buffer)
   - polyethylene (bags, protective foam sheet).

   Please observe the local regulations regarding the disposal of these packaging materials.
2 Your set consists of materials which can be recycled and reused if disassembled by a specialized company. Please follow local regulations on recycling your old set.
3 Do not dispose of dead batteries with your household waste. Dispose of batteries according to local regulations.
4 Note: Switching off the standby mode overnight (remove the AC power cord from the wall socket) will save energy.

## Accessories (Supplied)

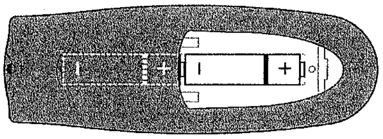
- Remote control
- Batteries (2 x AAA) for remote control
- AM loop antenna
- FM antenna wire
- AC power cord

## Safety Information

- Before operating the system, check that the operating voltage indicated on the typeplate (or the voltage indication beside the voltage selector) of your system is identical with the voltage of your local power supply. If not, please consult your dealer. The type plate is located at the rear of your system.
- When the system is switched on, do not move it around.
- Place the system on a solid base (e.g. a cabinet).
- Place the system in a location with adequate ventilation to prevent internal heat build-up in your system.
- Do not expose the system to excessive moisture, rain, sand or heat sources.
- Under no circumstances should you repair the unit yourself, as this will invalidate the warranty!
- If the system is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lens of the CD unit inside the system. Should this occur, the CD player will not operate normally. Leave the power on for about one hour with no disc in the unit until normal playback is possible.
- Electrostatic discharge may cause unexpected problems. See whether these problems disappear if you unplug the AC power cord and plug it in again after a few seconds.
- **To disconnect the system from the power supply completely, remove the AC power plug from the wall socket.**

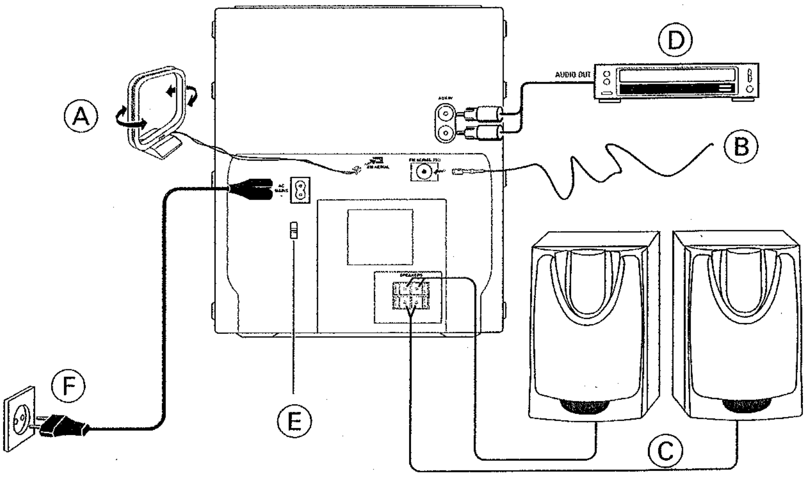
## Inserting the batteries into the remote control

- Insert the batteries (Type R03 or AAA) into the remote control as shown inside the battery compartment.



- To avoid damage from possible battery leakage, remove dead batteries or batteries that will not be used for a long time. For replacement use type R03 or AAA batteries.

## Rear Connection



### Ⓐ AM Antenna Connection

Connect the supplied loop antenna to the AM AERIAL terminal. Adjust the position of the AM loop antenna for the best reception.

### Ⓑ FM Wire Antenna Connection

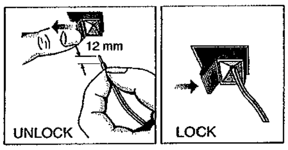
Connect the supplied FM wire antenna to the FM 75 Ω terminal. Adjust the position of the FM antenna for the best reception.

**Outdoor Antenna**
For better FM stereo reception connect an outdoor FM antenna to the FM AERIAL 75 Ω terminal using a 75 Ω coaxial wire.

# PREPARATIONS

## Ⓒ Speaker Connections

- Connect the right speaker to terminal **R**, with the red wire to + and the black wire to —.
- Connect the left speaker to terminal **L**, with the red wire to + and the black wire to —.
- Clip the stripped portion of the speaker wire as shown.


12 mm
UNLOCK
LOCK

## Ⓓ Connecting other equipment to your system

You can connect the TV, Laser Disc or VCR audio left and right output terminals to the AUX IN terminal at the rear of the system.

## Ⓔ Adjusting the Operating Voltage

*(for specific versions only)*

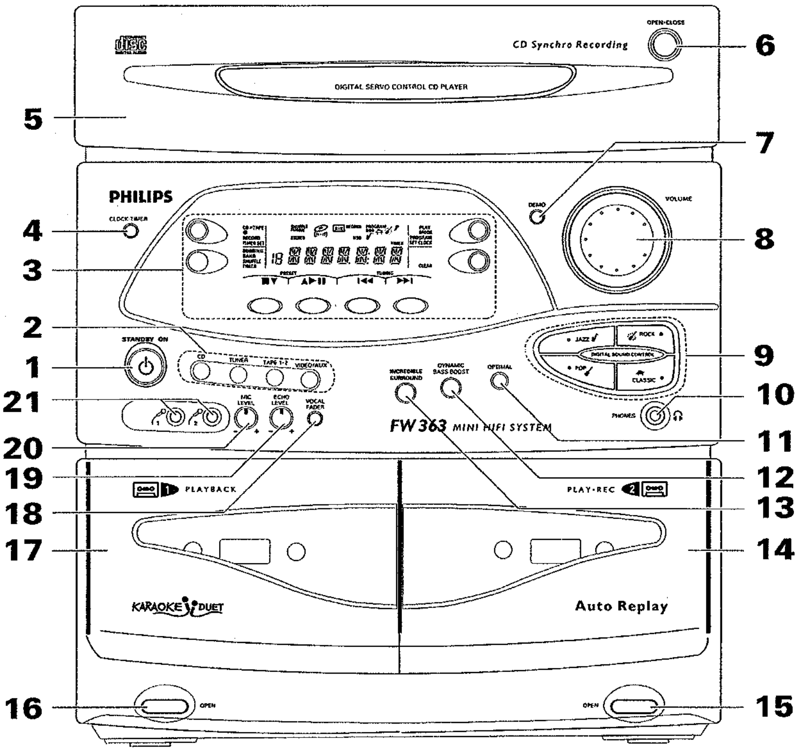
Before connecting the AC power cord to a wall outlet, make sure that the voltage selector at the rear of the system is set to the local power line voltage. If not, reset the selector before connecting to the wall outlet.

## Ⓕ AC Power Supply

After all other connections have been made, connect the AC power cord to the set and to the wall outlet.

# CONTROLS

## Front View


CD Synchro Recording
OPEN•CLOSE
DIGITAL SERVO CONTROL CD PLAYER
PHILIPS
CLOCK•TIMER
DEMO
VOLUME
STANDBY ON
CD
TUNER
TAPE 1•2
VIDEO/AUX
INCREDIBLE SURROUND
DYNAMIC BASS BOOST
OPTIMAL
JAZZ
ROCK
DIGITAL SOUND CONTROL
POP
CLASSIC
PHONES
MIC LEVEL
ECHO LEVEL
VOCAL FADER
FW363 MINI HIFI SYSTEM
PLAYBACK
PLAY•REC
KARAOKE DUET
Auto Replay
OPEN
OPEN
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21

# CONTROLS

## Front View

1 **STANDBY-ON**
- to switch the set on or to standby mode.

2 **SOURCE SELECTION**
- to select the following:
  - **TUNER** : to switch to Tuner mode.
  - **CD** : to switch to CD mode.
  - **TAPE 1-2** : to switch to Tape Deck 1 or 2 mode.
  - **VIDEO/AUX**: to switch to VIDEO/AUX mode (for external sources, e.g. TV, Laser Disc or VCR sound).

3 **MAGIC MENU USER INTERFACE AND DISPLAY**
- to select and display the control functions.

4 **CLOCK•TIMER**
- to set the clock or timer.

5 **CD TRAY**

6 **OPEN•CLOSE**
- to open or close the CD tray.

7 **DEMO**
- to display the various features offered by the system.

8 **VOLUME**
- to adjust the volume level.

9 **DIGITAL SOUND CONTROL (DSC)**
- to select the desired sound effect : JAZZ, ROCK, CLASSIC or POP.

10 **PHONES** 🎧
- to connect headphones jack.

11 **OPTIMAL**
- to select the sound setting that is tuned to the acoustics of the supplied speakers.

12 **DYNAMIC BASS BOOST (DBB)**
- to switch on bass boost to enhance bass response or to switch off bass boost.

13 **INCREDIBLE SURROUND**
- to switch on or off the incredible surround sound effect.

14 **TAPE DECK 2**

15 **OPEN**
- to open TAPE DECK 2 cassette compartment.

16 **OPEN**
- to open TAPE DECK 1 cassette compartment.

17 **TAPE DECK 1**

18 **VOCAL FADER** *(for specific versions only)*
- to fade out the vocal of the original song.

19 **ECHO LEVEL** *(for specific versions only)*
- to adjust the echo level for karaoke or microphone recording.

20 **MIC LEVEL** *(for specific versions only)*
- to adjust the mixing level for karaoke or microphone recording.

21 **MIC 1 and 2** *(for specific versions only)*
- to connect microphones jack.

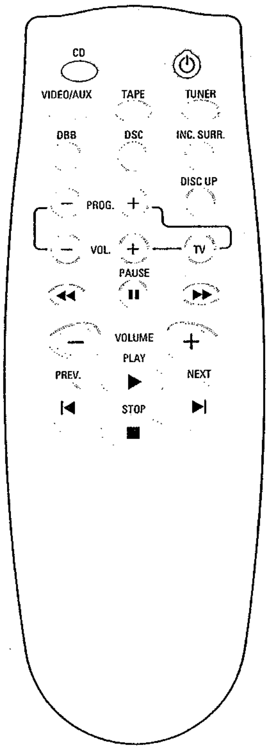
## REMOTE CONTROL

### Remote Control Functions

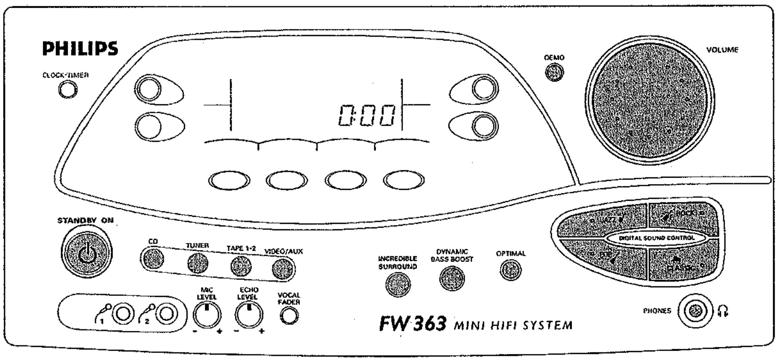
- First select the source you wish to control by pressing one of the source selection keys on the remote control (e.g. CD, TUNER, TAPE or VIDEO/AUX).
- Then select the desired function (PLAY, NEXT, etc.).

*Notes:*
- *Whenever a remote control button is pressed, the source icon on the set display will flicker. This indicates the remote control signal is received by the set.*
- *For TV/VCR operation, the accessory TV or VCR must use the RC-5 code remote control system.*

| | |
|---|---|
| ⏻ | to switch the unit to standby mode. |
| **CD** | to select CD mode. |
| **VIDEO/AUX** | to select VIDEO/AUX or external mode. |
| **TAPE** | to select TAPE 1/2 mode. |
| **TUNER** | to select TUNER mode. |
| **INC. SURR.** | to switch on or off the incredible surround sound effect. |
| **DSC** | to select digital sound control: JAZZ, ROCK, CLASSIC, POP or OPTIMAL. |
| **DBB** | to switch on and off dynamic bass boost. |
| **DISC UP** | not functional for this model. |
| **PROG. +/−** | to select previous/next channel for TV/VCR. |
| **VOL. +/−** | to adjust the TV volume |
| **TV** | to select TV mode. |
| **PAUSE ❚❚** | to interrupt playback in CD or Tape mode. |
| **◀◀ / ▶▶** | |
| for TUNER | to select a lower/higher frequency. |
| for CD | to search for a particular passage. |
| for Tape | to fast forward/rewind the cassette. |
| **VOLUME +/−** | to adjust the volume of the system. |
| **PLAY ▶** | to start playback in CD or Tape mode. |
| **STOP ■** | to stop playback in CD or Tape mode. |
| **⏮ PREV. / NEXT ⏭** | |
| for TUNER | to select a lower/higher tuner preset station. |
| for CD | to select previous/next CD track. |



## OPERATING THE SYSTEM



### Demo mode

The system has a demonstration mode that shows the various features offered by the system. Whenever the system is connected to an AC power source, the demonstration mode will start automatically.

**To stop demonstration mode**
- Press **DEMO**, **STANDBY - ON**, **CD**, **TUNER**, **TAPE 1-2**, **VIDEO/AUX** or CD **OPEN•CLOSE** button on the system (or ⏻, **CD**, **TUNER**, **TAPE** or **VIDEO/AUX** on the remote control) to stop the demonstration.

**To switch on demonstration mode**
- Press **DEMO**.
  → The display will show "WELCOME TO THE AUDIO WORLD", then a demonstration of the various features will follow.

**Important:**
Before you begin operating the system, complete the preparation procedures.

### Switching the system ON

- Press **STANDBY-ON**, **CD**, **TUNER**, **TAPE 1-2** or **VIDEO/AUX** (or **CD**, **TUNER**, **TAPE** or **VIDEO/AUX** on the remote control).

### Switching the system to standby mode

- Press **STANDBY-ON** again (or ⏻ on the remote control).

### Selecting the Sound Source

- Press the respective source button: **CD**, **TUNER**, **TAPE 1-2** or **VIDEO/AUX** (or **CD**, **TUNER**, **TAPE** or **VIDEO/AUX** on the remote control).
  → The display indicates the selected sound source.

*Note:*
*For an external sound source, make sure that you have connected the audio left and right output terminals of the external equipment (TV, VCR or Laser Disc player) to the AUX IN terminals at the rear of the set.*

### Volume Adjustment

Turn **VOLUME** right or left (or press **VOLUME** + or − on the remote control) to increase or decrease the sound level.

**For Personal Listening**
Connect the headphones to the PHONES 🎧 socket (3.5mm). The speakers will be muted.

### Digital Sound Control (DSC)

- To enjoy a special sound effect, press **JAZZ** ( ♪ ), **ROCK** ( ✶ ), **CLASSIC** ( ♬ ) or **POP** ( ♪ ).
- You can also press **DSC** on the remote control to select the respective sound setting, including **OPTIMAL**.

### Optimal Sound

- Press **OPTIMAL** to hear the sound setting that is tuned to the acoustics of the supplied speakers.

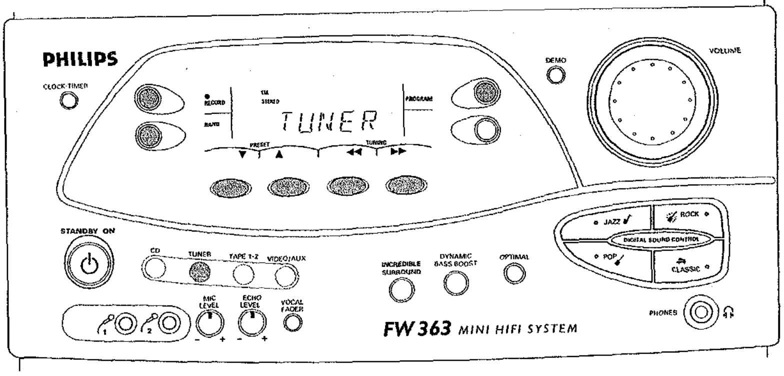
## Dynamic Bass Boost (DBB)

- Press **DBB** to enhance the bass response.
  → The DBB flag lights up.

## Incredible Surround

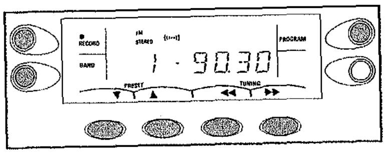
INCREDIBLE SURROUND

- In additional to all other sound settings, you can switch on or off the incredible surround sound feature by pressing **INCREDIBLE SURROUND**.
  → This creates a phenomenal surround sound effect even if the speakers are positioned close to the system. The sound becomes "incredibly" spatial.
  → The INCREDIBLE SURROUND button lights up.


PHILIPS
CLOCK·TIMER
RECORD
BAND
FM STEREO
TUNER
PROGRAM
PRESET
TUNING
DEMO
VOLUME
STANDBY ON
CD
TUNER
TAPE 1·2
VIDEO/AUX
MIC LEVEL
ECHO LEVEL
VOCAL FADER
INCREDIBLE SURROUND
DYNAMIC BASS BOOST
OPTIMAL
JAZZ
ROCK
DIGITAL SOUND CONTROL
POP
CLASSIC
PHONES
FW363 MINI HIFI SYSTEM

## Tuning to radio stations

1 Press **TUNER** on the unit or on the remote control to select TUNER mode.
  → First 'TUNER' appears on the display and after a few seconds it will show the current frequency. The available display button functions light up:


RECORD
BAND
FM STEREO
PROGRAM
1 - 90.30
PRESET
TUNING

2 Press BAND to select the desired waveband : FM or MW.

3 Press TUNING ◀◀ or ▶▶ for more than one second and release.
  → The display will show 'SEARCH' until a station with sufficient signal strength is found.

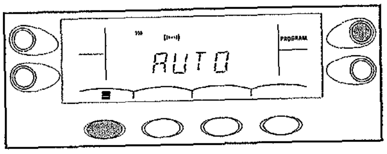
- Repeat this procedure until the desired station is reached.
- To tune to a weak station, briefly press TUNING ◀◀ or ▶▶ until the display shows the right frequency and/or when the best reception has been obtained.

*Note:*
*If you briefly press TUNING ◀◀ or ▶▶ (◀◀ or ▶▶ on the remote control), the frequency changes step by step.*

## Storing Preset Stations

You can store up to 20 stations in the memory. When a preset station is selected, the preset number appears next to the frequency on the display.

### Automatic programming

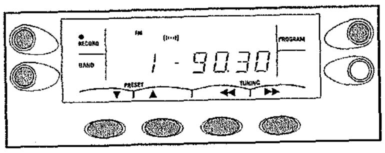

PROGRAM
AUTO

1 Press **TUNER** on the unit or on the remote control.
2 Press PROGRAM for more than one second.
  → PROGRAM flashes and 'AUTO' is displayed.
  → Every available station will be stored automatically. The frequency and preset number will be displayed briefly.
  → It will stop searching when all the available stations are stored or the memory for 20 preset stations is used.
  → The set will remain tuned to the last stored preset number.

- You can cancel the automatic programming by pressing PROGRAM or ■.

*Note:*
*If you want to reserve a section of preset numbers, for example preset number 1 to 9, select preset 10 before starting automatic programming: now only the preset numbers 10 to 20 will be programmed.*

### Manual programming

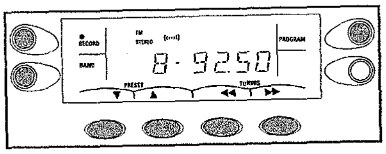

RECORD
BAND
FM
PROGRAM
1 - 90.30
PRESET
TUNING

1 Press **TUNER** on the unit or on the remote control.
2 Press PROGRAM for less than one second.
  → PROGRAM flashes on the display.
3 Press BAND to select the desired waveband : FM or MW.
4 Press TUNING ◀◀ or ▶▶ to tune to the desired frequency.
5 Press PRESET ▼ or ▲ (or **PREV** ⏮ **/ NEXT** ⏭ on the remote control) to select a preset number.
6 Press PROGRAM again.
  → PROGRAM stop flashing, and the station is stored.

- Repeat the above procedure to store other preset stations.

## Tuning to Preset Stations

- Press PRESET ▼ or ▲ (or **PREV** ⏮ **/ NEXT** ⏭ on the remote control) to select the desired preset number.
  → The preset number, frequency and waveband appear on the display.


RECORD
BAND
FM STEREO
PROGRAM
8 - 92.50
PRESET
TUNING

## Changing the FM/MW tuning grid

*(for specific versions only)*

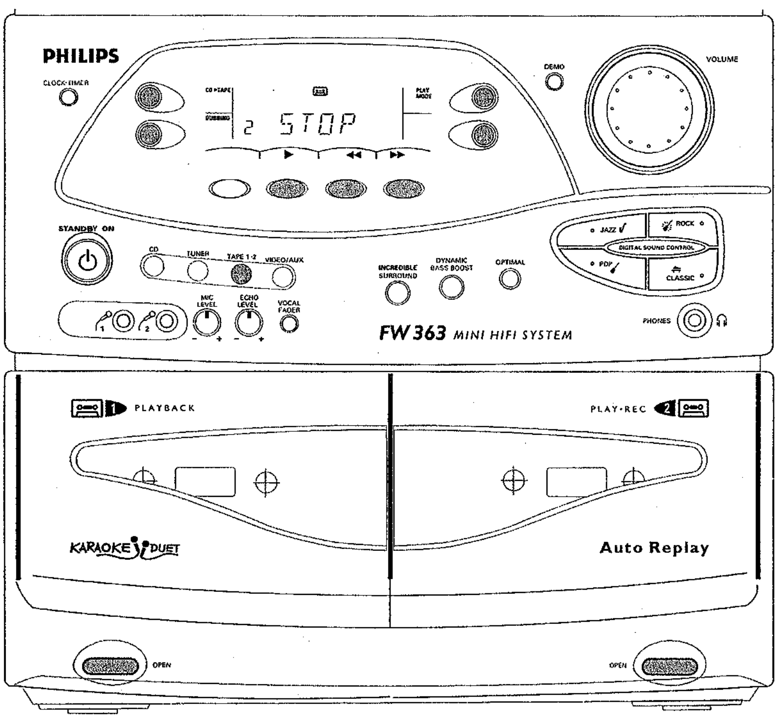
**For FM Band : change from 50kHz to 100kHz or vice versa**
**For MW Band : change from 9kHz to 10kHz or vice versa**

*Changing of tuning grid will erase all previously stored preset stations.*

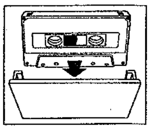
While in TUNER mode, press the **TUNER** button for ***more than 5 seconds***. Display will shows "GRID 10" or "GRID 9".

*Note:*
*GRID 9 indicates that the tuning grid is in step of 50kHz in FM band or 9kHz in MW band. GRID 10 indicates that the tuning grid is in step of 100kHz in FM band or 10kHz in MW band.*

# CASSETTE DECK



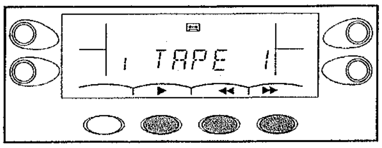
## Loading a cassette



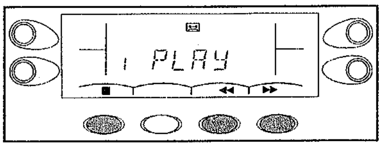
- Press **OPEN**.
- The cassette compartment door opens.
- Load the cassette with the open side downward and the full spool to the left.
- Close the cassette compartment door.
  → The deck automatically selects the cassette type (NORMAL or CHROME ($CrO_2$)).

## Tape Playback

1 Press **TAPE 1-2** (or **TAPE** on the remote control) to select either TAPE DECK 1 or TAPE DECK 2 mode.



2 Load the cassette into the desired **cassette deck**.
3 Press ▶ (or **PLAY** ▶ on the remote control) to start playback.



4 Press ■ (or **STOP** ■ on the remote control) to end playback.

---

# CASSETTE DECK

*Note:*
*When the cassette has stopped playing, the set will switch to the standby mode automatically after 15 minutes if no button is pressed.*

## Auto Replay

The PLAY mode enables you to select AUTO REPLAY mode for both Tape Deck 1 and 2.

- Default setting of set is with AUTO REPLAY mode.
- Press PLAY mode once, display scrolls 'ONCE' message once and **ONCE** mode is selected.
- Press PLAY mode again, display scrolls 'AUTO REPLAY' message once and **AUTO REPLAY** mode is selected.

**AUTO REPLAY:**
- When the cassette reaches its end during tape play, it will rewind by itself to the beginning and starts playing again. This will be repeated for 10 times. During the rewinding of the cassette, display keeps scrolling 'AUTO REPLAY'.

**ONCE:**
- When the cassette reaches its end during tape play, it will stop.

*Note:*
*This feature is only applicable during Tape Play.*

## Winding/Rewinding

**At the stop mode**

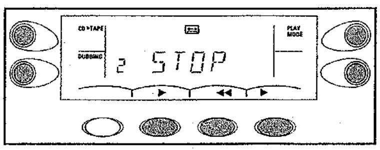
1 You can rewind or wind the cassette by pressing ◀◀ or ▶▶, (◀◀ or ▶▶ on the remote control) respectively.
  → The cassette will stop automatically at the end of the winding or rewinding
2 Press ■ (or **STOP** ■ on the remote control) to stop winding or rewinding.

**During playback**

1 You can search for a particular passage or beginning of a track by pressing and holding ◀◀ or ▶▶, (◀◀ or ▶▶ on the remote control) respectively.
  → During searching, the sound is reduced to a low volume.
  → When you release ◀◀ or ▶▶, the cassette continues playing.

*Note:*
*During winding or rewinding a cassette, it is possible to select another source mode (e.g. TUNER, CD or VIDEO/AUX mode).*

## Recording from other sources (only on Tape Deck 2)



1 Press **TAPE 1-2** to select **tape deck 2**.
2 Load a blank cassette into **tape deck 2**.
3 Press **CD**, **TUNER** or **VIDEO/AUX**.
4 Press ● RECORD to start recording.
  → The RECORD flag starts flashing.
5 Press ■ to stop recording.

*Note:*
*During recording, it is not possible to listen to another sound source.*

**Dubbing cassettes (from Tape Deck 1 to Tape Deck 2)**

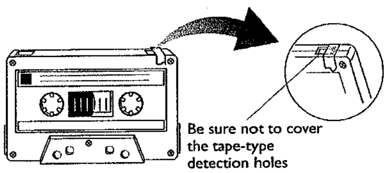
1 Press **TAPE 1-2** to select **tape deck 2** .
2 Load the prerecorded cassette into **tape deck 1** and a blank cassette into **tape deck 2**.
  → Make sure that both cassettes have their full spools to the left.
3 Press DUBBING and then press ◀◀ or ▶▶ for respective dubbing speed mode.
  → NORMAL (normal speed) or FAST (high speed) appears on the display.
4 Press DUBBING again to start recording.
  → The RECORD flag starts flashing.
  → HSD appears on the display for high speed dubbing.
5 Press ■ to stop dubbing.

*Notes:*
- *At the end of side A, flip the cassettes to side B and repeat the procedure.*
- *Dubbing of cassettes is only possible in the TAPE DECK 2. To ensure good dubbing, use cassettes of the same length.*
- *During high speed dubbing in Tape mode, the sound is reduced to a low volume.*
- *You can switch to other sound source while dubbing.*

# CASSETTE DECK

## General Information

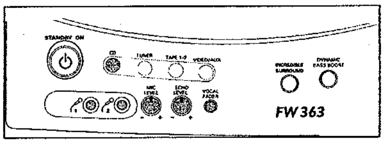
- For recording, use only a cassette of IEC type I (normal cassette) or IEC type II (Chrome). The respective cassette type is selected automatically.
- The tape in the cassette is secured at both ends with leader tape. At the beginning and end of a cassette, nothing will be recorded for six to seven seconds.
- The recording level is set automatically, regardless of the position of VOLUME.
- Check and tighten slack tape with a pencil before use. Slack tape may get jammed or may burst in the mechanism.
- To prevent accidental recording, break out the tab on the left shoulder of the cassette side you want to protect. To re-record the cassette, cover each hole with cellophane tape. Do not cover the Chrome tape detection hole when covering the tab opening.


Be sure not to cover
the tape-type
detection holes

- C-120 tape is extremely thin and may be easily deformed or damaged. It is not recommended for use in this unit.
- Store the cassettes at room temperature and do not put them too close to a magnetic field (for example, transformers, TVs or speakers).

# KARAOKE

## Karaoke *(for specific versions only)*


STANDBY ON
CD
TUNER
TAPE 1-2
VIDEO/AUX
INCREDIBLE SURROUND
DYNAMIC BASS BOOST
MIC LEVEL
ECHO LEVEL
VOCAL FADER
FW363

**Microphone mixing**

1 Set the **MIC LEVEL** control to the minimum level to prevent acoustic feedback (e.g. a loud howling sound) before you connect the microphone.
2 Connect either 1 or 2 microphones to the mic socket.
3 Press **CD, TUNER, TAPE 1-2** or **VIDEO/AUX.**
4 Play the selected source.
5 Adjust the volume with **VOLUME** control.
6 Adjust the **MIC LEVEL** control to the mixing level that you want.
7 Adjust the **ECHO LEVEL** control to the echo level that you want.
8 Press **VOCAL FADER** to suppress the vocals on special recorded Karaoke CDs.
→ When the VOCAL FADER is switched on, the 🎤 appears on the display.
9 Start singing or talking through the microphone.

**Recording the mixed sound**

During microphone mixing, you can record the mixed sound on a cassette in TAPE DECK 2.

1 Load a blank cassette in **tape deck 2**.
2 Press ● RECORD .

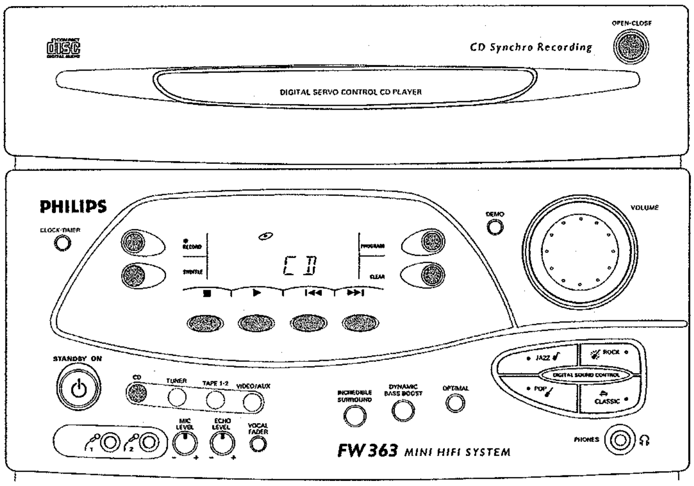
*Notes:*
1. *For maximum VOCAL FADER effect, you are advised to switch off the Incredible Surround.*
2. *If you do not intend to record via the microphone, unplug the microphone to avoid accidental mixing with other recording source.*

# COMPACT DISC

**Warning!**

1) This set is designed for conventional CDs. Do not use any accessories like disc stabilizer rings or CD treatment sheets, etc. which may damage the CD mechanism.
2) Do not load more than one disc into the tray.

In addition to the conventional 12-cm disc, 8-cm disc can also be used without an adaptor.

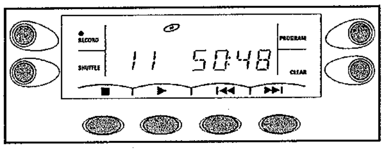

COMPACT DISC
OPEN•CLOSE
CD Synchro Recording
DIGITAL SERVO CONTROL CD PLAYER
PHILIPS
CLOCK•TIMER
RECORD
SHUFFLE
PROGRAM
CLEAR
CD
DEMO
VOLUME
STANDBY ON
CD
TUNER
TAPE 1-2
VIDEO/AUX
INCREDIBLE SURROUND
DYNAMIC BASS BOOST
OPTIMAL
JAZZ
ROCK
DIGITAL SOUND CONTROL
POP
CLASSIC
MIC LEVEL
ECHO LEVEL
VOCAL FADER
PHONES
FW 363 MINI HIFI SYSTEM

## Loading a Disc

1 Press **CD** on the unit or remote control to select CD mode.
2 Press **OPEN•CLOSE**.
→ The CD tray slides out.
3 Load a disc with ***printed side up***.
4 Press **OPEN•CLOSE** to close the CD tray.
→ The total number of tracks and playing time appear on the display.

## Playing a Disc

1 Press ▶ (or **PLAY** ▶ on the remote control) to start play.
→ The track number and elapsed playing time of the current track appear on the display.


RECORD
SHUFFLE
11 50:48
PROGRAM
CLEAR

- To interrupt play, press ❚❚ (or **PAUSE** ❚❚ on the remote control).
→ The playing time flashes.
- To resume play, press ▶ again (or **PLAY** ▶ on the remote control).

2 To stop play, press ■ (or **STOP** ■ on the remote control).

*Note:*
*When the CD has stopped playing, the set will switch to the standby mode automatically after 15 minutes if no button is pressed.*

## Selecting a desired track

**Selecting a desired track at the stop mode**

1 Press I◀◀ or ▶▶I (or **PREV** I◀ **/ NEXT** ▶I on the remote control) until the desired track appears on the display.
2 Press ▶ (or **PLAY** ▶ on the remote control) to start playback.
→ The selected track number and elapsed playing time appear on the display.

**Selecting a desired track during play mode**

1 Press I◀◀ or ▶▶I (or **PREV** I◀ **/ NEXT** ▶I on the remote control) until the desired track appears on the display.
→ The selected track number and elapsed playing time appear on the display.
- If you press I◀◀ once it will skip to the beginning of the current track and play the track again.

## COMPACT DISC

### Searching for a particular passage during play

- Press and hold |◀◀ or ▶▶| ( ◀◀ or ▶▶ on the remote control) until the desired passage is located. During the search, the sound is played faster than normal at a reduced volume. Play returns to normal when |◀◀ or ▶▶| is released.

### Shuffle

SHUFFLE – playing all the tracks in random order. It can also be used when tracks are programmed.

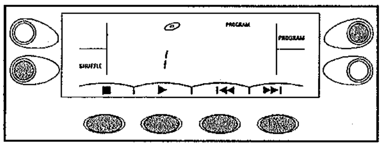
**To shuffle all the tracks**

1 Press SHUFFLE.
   → "SHUFFLE" flashes briefly on the display.
   → The SHUFFLE flag, the track selected at random appear on the display.
- The tracks will now be played in random order until you press ■.

2 Press SHUFFLE again to resume normal playback.
   → The SHUFFLE flag disappears from the display.

### Programming Tracks

Programming tracks of a loaded CD is possible when CD playback is stopped. The display will indicate the total tracks stored in the program. Up to 20 tracks can be stored in the memory in any order. When 20 tracks are stored and you attempt to store another track, the display will show "PROGRAM FULL".



1 Load the desired disc in the disc tray.
2 Press PROGRAM to start programming.
   → The PROGRAM flag flashes on the display.
3 Press |◀◀ or ▶▶| to select the desired track.
4 Press PROGRAM to store the track.
- Repeat steps **3** to **4** to store other tracks.

5 Press ■ once to end programming.
   → The total number of tracks programmed and total playing time will appear on the display.

**Playing the program**

1 Press ▶ again (or **PLAY** ▶ on the remote control) to start program playback.
   → The track number and elapsed playing time of the current track will appear on the display.
2 Press ■ (or **STOP** ■ on the remote control) to stop program playback.

**Reviewing the program**

Reviewing of a program is only possible when CD playback is stopped.

- Press |◀◀ or ▶▶| repeatedly to review the programmed tracks.
- Press ■ to exit review mode.

**Erasing the program (when playback is stopped)**

- Press CLEAR.
   → "PROGRAM CLEARED" appears on the display.

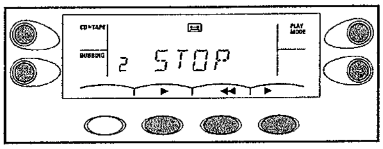
*Note:*
*The program is also erased when the set is disconnected from the power supply. If the CD tray is opened, the programmed tracks will be erased and "CLEARED" will scroll on the display once.*

### CD Synchro Start Audio Recording

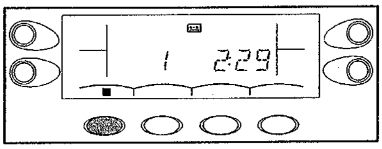
**During CD synchro start audio recording,**

- It is not advisable to fast forward/rewind your cassette in TAPE DECK 1.
- It is not possible to listen to another sound source.

1 Press **CD** on the unit or on the remote control to select CD mode.
2 Load a disc into the disc tray.
3 You can program the tracks in the order you want them to be recorded (see Programming Tracks). If not, the tracks are recorded according to the disc.
4 Press **TAPE 1-2** (or **TAPE** on the remote control) to select **tape deck 2**.

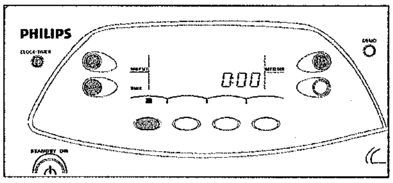


5 Load a blank cassette (full spool to the left) into **tape deck 2**.
6 Press CD ▶ TAPE to start recording.
   → The RECORD flag flashes on the display.
   → The CD starts playing after a seven-second delay to prevent recording on the leader tape at the beginning of the cassette.



7 Press ■ to stop recording.

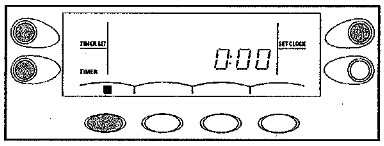
## CLOCK SETTING



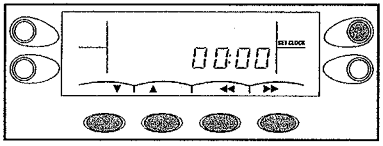
### Setting the clock

The clock is in 24-hour mode, e.g. 00:00 or 23:59.

1 Press **CLOCK•TIMER**.
   → "0:00" starts flashing.



2 Press SET CLOCK.
   → "00:00" starts flashing.



3 Set the hour with ▼ or ▲.
4 Set the minutes with ◀◀ or ▶▶.
5 Press SET CLOCK again to store the setting.
   → The clock starts running.

*Note:*
*When a power interruption occurs, the clock settings are erased.*

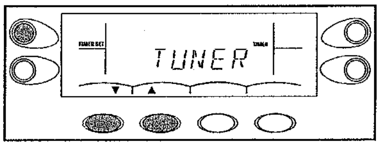
## TIMER SETTING

### Setting the Timer

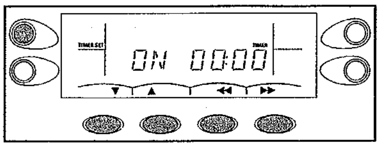
- The system can switch on to CD, TUNER or TAPE 1 mode automatically at a preset time. It can serve as an alarm to wake you up. After half an hour from the preset time, the system will return to the standby mode if no button is pressed.
- Before setting the timer, make sure the clock is set correctly.
- The timer works only once for each setting.
- **The volume of the timer will be at the last setting before the set is switched to standby mode.**

**Timer Setting**

1 Press **CLOCK•TIMER**.
2 Press TIMER SET.
   → The TIMER flag flashes.



3 Press ▼ or ▲ to select the desired source.
   → The display will switch as follows:
   TUNER → CD → TAPE 1 → TUNER ...
4 Press TIMER SET to confirm your selection.
   → The display will show "ON 00:00" and "00:00" flashes.



5 Press ▼ or ▲ to set the hour for the timer to start.
6 Press ◀◀ or ▶▶ to set the minutes for the timer to start.
7 Press TIMER SET to store the start time.
   → The TIMER is now set.
   → The TIMER flag remains lit.

**To stop the TIMER**

1 Press **CLOCK•TIMER**.
2 Press TIMER on the set.
   → The TIMER is now off.

**To start the TIMER again**

1 Press **CLOCK•TIMER**.
2 Press TIMER on the set.
   → The display will show the last set start time of the TIMER and its flag.
   → The TIMER flag remains lit.

*Notes:*
1. *If the source selected is TUNER, the last tuned frequency will be switched on.*
2. *If the source selected is CD, the first track of the disc will be played. If the CD tray is empty, the TUNER source will be selected instead.*
3. *If the source selected is TAPE 1, when the preset time is reached during high speed dubbing, the TUNER source will be selected instead.*

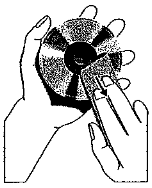
# MAINTENANCE

## Maintenance

**Cleaning the Cabinet**

- Use a soft cloth slightly moistened with a mild detergent solution. Do not use a solution containing alcohol, spirits, ammonia or abrasive.

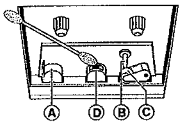
**Cleaning Discs**



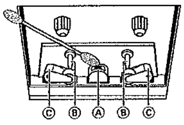
- When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the center out.
- Do not use solvents such as benzine, thinner, commercially available cleaners, or antistatic spray intended for analog records.

**Cleaning the Heads and the Tape Paths**

- To ensure good recording and playback quality, clean the heads Ⓐ and Ⓓ, the capstan(s) Ⓑ, and pressure roller(s) Ⓒ after every 50 hours of tape operation.



**Tape Deck 1**



**Tape Deck 2**

- Use a cotton swab slightly moistened with cleaning fluid or alcohol.
- You can also clean the head by playing a cleaning tape through once.

**Demagnetizing the heads**

- Use a demagnetizing cassette available at your dealer.

# SPECIFICATIONS

## Specifications

**AMPLIFIER**

| | |
|---|---|
| Output power | 600 W PMPO / 2 x 25 W RMS (10% THD, 3 Ω, ±1 dB) |
| Power band width | 40 - 20000 Hz |
| Frequency response | 40 - 20000 Hz |
| Signal-to-noise ratio | ≥ 75 dBA |
| Stereo separation | ≥ 48 dB (1 kHz) |
| Input sensitivity | |
| Auxiliary | 400 mV |
| Microphone *(for specific versions only)* | 2.5 mV |
| Outputs | |
| Speakers | ≥ 3 Ω |
| Headphones | 32 Ω - 1000 Ω |

**TUNER**

| | |
|---|---|
| FM wave range | 87.5 - 108 MHz |
| MW wave range | |
| 9 kHz Grid | 531 - 1602 kHz |
| 10 kHz Grid | 530 - 1700 kHz |
| Sensitivity at 75 Ω, 26 dB S/N ratio, FM mono | 2.8 µV |
| 46 dB signal-to-noise ratio, FM Stereo | 41.2 µV |
| FM Frequency response | 63 - 12500 Hz (±3 dB) |
| Signal-to-noise ratio | ≥ 50 dBA |
| Total Harmonic Distortion | < 3% |

**CD PLAYER**

| | |
|---|---|
| Frequency range | 20 - 20000 Hz |
| Signal-to-noise | ≥ 86 dBA |
| Channel separation | ≥ 40 dB |
| Total harmonic distortion | ≤ 65 dB |

**CASSETTE DECK**

| | |
|---|---|
| Frequency range | |
| $CrO_2$ tape (type II) | 80 - 12500 Hz (±8 dB) |
| Normal tape (type I) | 80 - 12500 Hz (±8 dB) |
| Signal-to-noise ratio | |
| $CrO_2$ tape (type II) | ≥ 48 dBA |
| Normal tape (type I) | ≥ 44 dBA |
| Wow and flutter | ≤ 0.4% DIN |

**MAIN UNIT**

| | |
|---|---|
| Material/finish | Metal and polystyrene |
| Dimensions (w x h x d) | 265 x 316 x 363 (mm) |
| Weight | 6.7 kg approx. |

**SPEAKER BOX**

| | |
|---|---|
| Dimensions (w x h x d) | 210 x 310 x 220 (mm) |
| Weight | 2.8 kg approx. |
| Speaker woofer | 1 x 5.25 inches |
| Speaker tweeter | 1 x 2.5 inches |
| Speaker polydome tweeter | 1 x 1 inch |

***Subject to modification***

# TROUBLESHOOTING GUIDE

**Warning! Under no circumstances should you try to repair the set yourself, as this will invalidate the warranty.**

- If a fault occurs, check the points listed below before taking the set in for repair.
- Should any problems persist after you have made these checks, consult your nearest dealer or service center.

| SYMPTOM | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| **RADIO RECEPTION** | | |
| The STEREO indicator flashes. | The signal is too weak. | Adjust the antenna. |
| Severe hum or noise. | The signal strength is too weak. | Adjust the antenna. |
| | The TV or VCR is too close to the stereo system. | Separate the stereo system from the TV or VCR.<br>Connect an external antenna for better reception. |
| **CASSETTE DECK OPERATION** | | |
| "CANNOT RECORD" is displayed. | No cassette in the cassette deck. | Insert a blank cassette into the cassette deck. |
| | The protection tab has been broken. | Put a piece of clear adhesive tape over the opening. |
| "RECORDING ACTIVE" is displayed. | A recording is active. | Stop the recording or wait unitl it is finished. |
| Recording or playback cannot be made or there | Dirty tape heads. | See section on cassette deck maintenance. |
| is a decrease in audio level. | Magnetic build-up in the record/playback head. | Use demagnetizing cassette. |
| Excessive wow or flutter, or sound drop-out. | Contamination of the capstans or pressure rollers. | See section on cassette deck maintenance. |
| **CD PLAYER OPERATION** | | |
| "WRONG TRACK" is displayed. | The selected track number does not exist on this CD or it is not included in this program | Select a correct track number. |
| "NO DISC" is displayed. | The disc is inserted upside down. | Place CD with printed side up. |
| | Moisture condensation. | Wait until lens has adjusted to normal room temperature. |
| | There is no disc in the CD tray. | Insert a CD. |
| | The CD is dirty, badly scratched or warped. | Replace or clean the CD. |

## TROUBLESHOOTING GUIDE

| | | |
|---|---|---|
| **GENERAL** | | |
| Set not working. | Set does not react when buttons are pressed. | Press STANDBY-ON to switch the unit off, then switch it on again. Or, unplug the AC power plug from the wall outlet, then plug it in again. |
| No or poor sound. | Volume is not turned up. | Adjust VOLUME. |
| | The headphones are connected. | Disconnect the headphones. |
| | Speakers are not connected or are connected wrongly. | Check that the speakers are connected correctly.<br>Make sure that the stripped speaker wire is clamped. |
| Reversed left and right sound. | Speakers are connected wrongly. | Check the speaker connections and speaker location. |
| Lack of bass sound or apparently imprecise physical location of musical instruments. | Speakers are connected wrongly. | Check the speaker connection for proper phasing, red/black wires to red/black terminals. |
| Clock blinking. | There was a power disruption. | Reset the clock. |
| Remote control has no effect on the set. | The distance to the system is too large. | Reduce the distance. |
| | Batteries are inserted incorrectly. | Insert the batteries correctly. |
| | Batteries are exhausted. | Replace the batteries. |
| | Wrong sound source is selected. | Select the sound source before pressing the function button (PLAY, PREV./NEXT, etc.). |
| Timer not working. | Timer not on. | Press CLOCK•TIMER on the set to switch on the timer. |
| | Dubbing/recording is active. | Stop dubbing/recording. |
| "PRESS DEMO TO EXIT" is displayed. | Demo mode is switched on. | Press STANDBY-ON or DEMO to switch off the demo. |

## Dismantling & Service hints

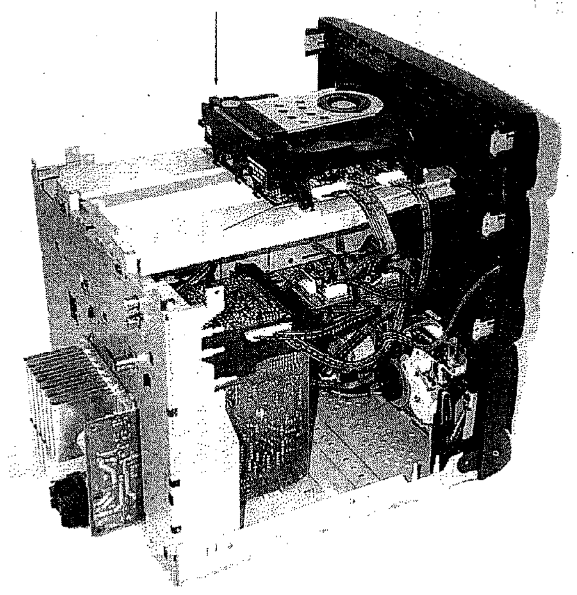


**Figure 1**

1) Remove the top cabinet.
2) Remove the 2 screw on the CD module.

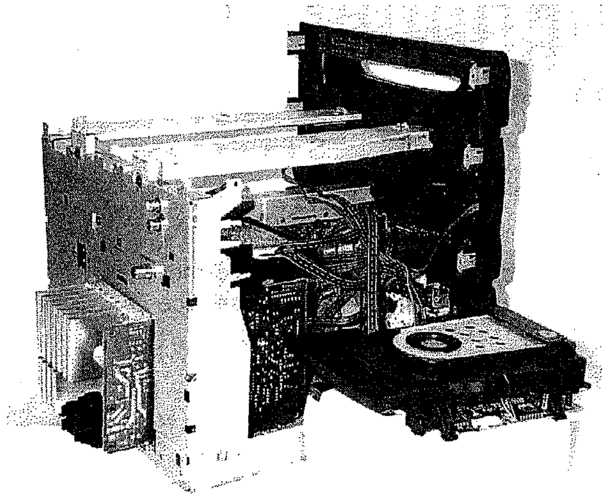


**Figure 2**

3) Place the CD module on the side for servicing.

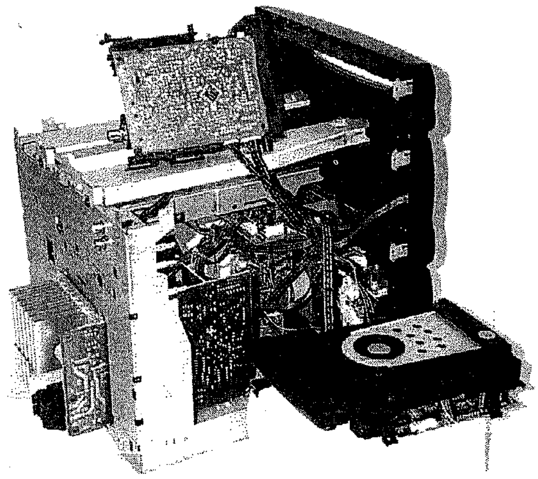


**Figure 3**

4) Remove the screw for the tuner on the back panel.
Figure 3 show the tuner & CD service

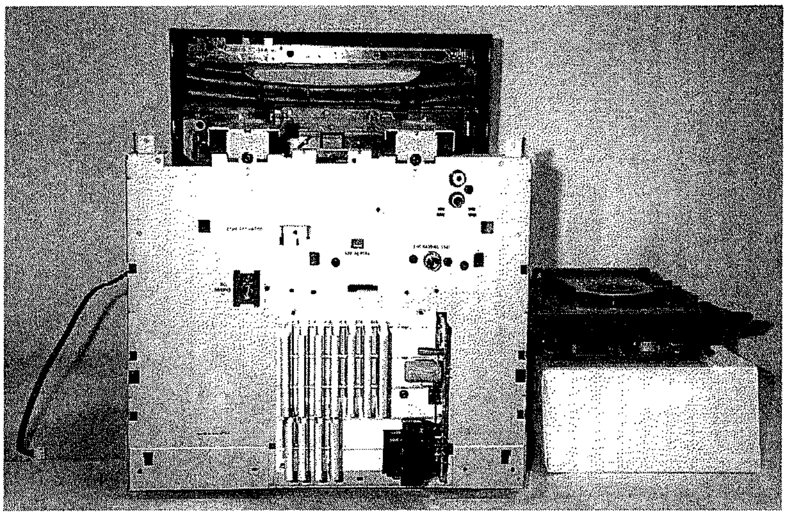


Figure 4

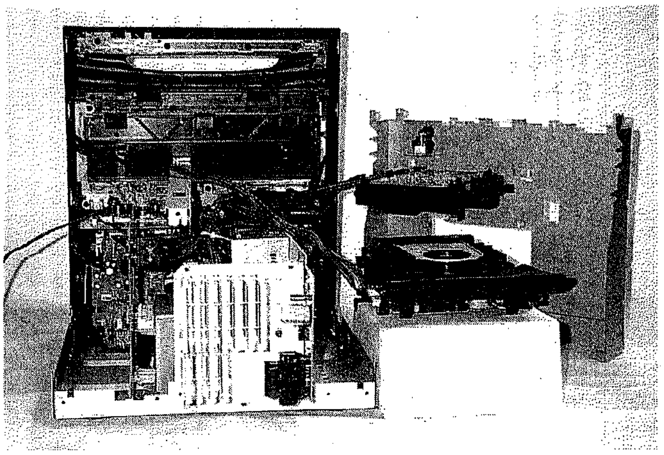


Figure 5

5) Remove the back panel in-order to service the power, transformer board or the AF & front board. Figure 5 show the possible service position.

# SERVICE TEST PROGRAM

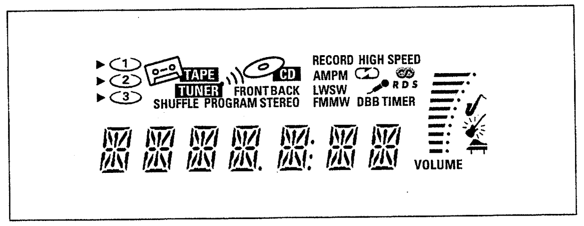
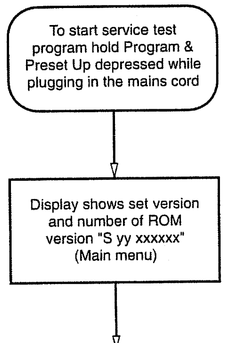

1
2
3
TAPE
CD
RECORD HIGH SPEED
AMPM
TUNER
FRONT BACK
LWSW
RDS
SHUFFLE PROGRAM STEREO
FMMW DBB TIMER
VOLUME

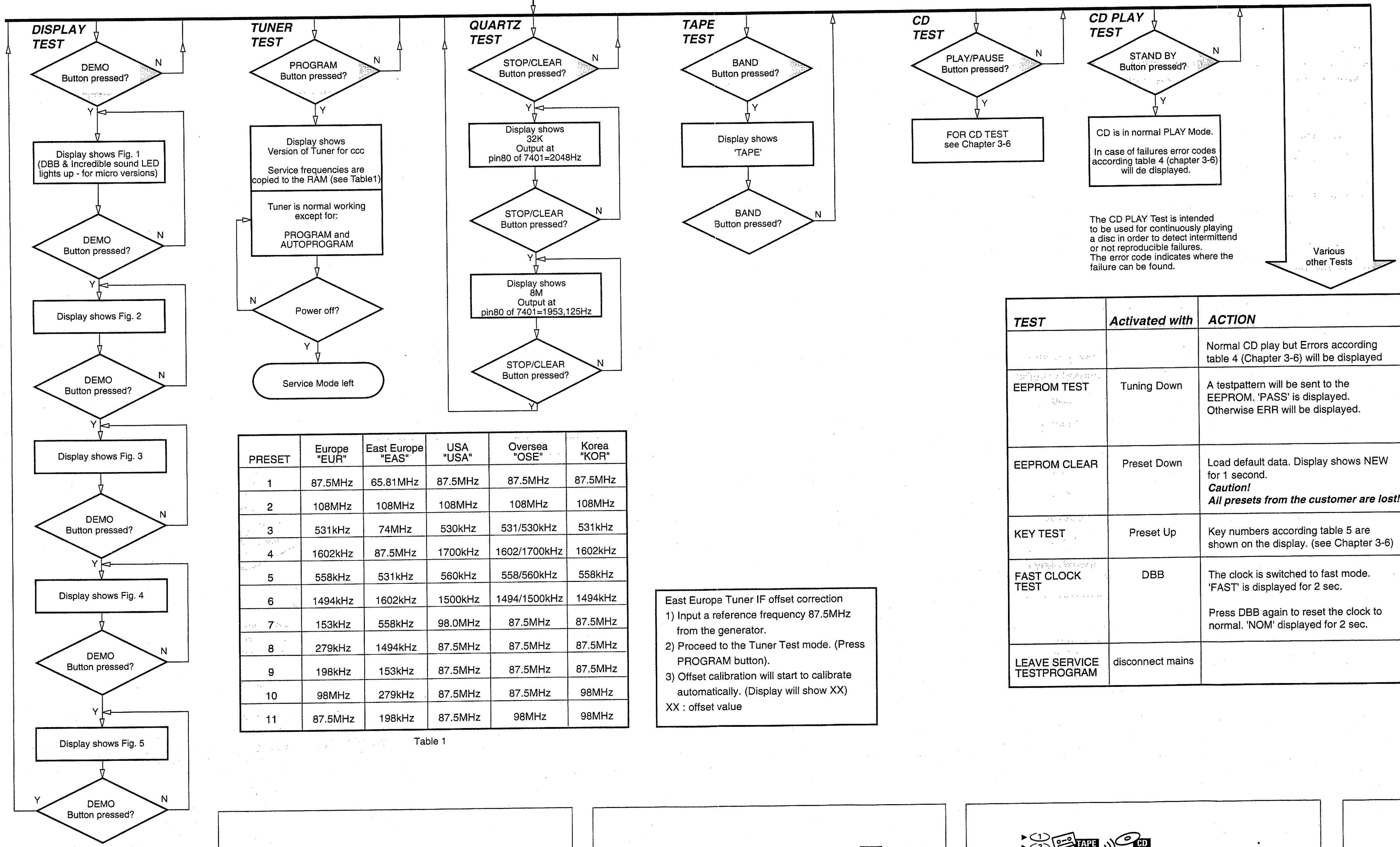
Figure 1


To start service test program hold Program & Preset Up depressed while plugging in the mains cord
Display shows set version and number of ROM version "S yy xxxxxx" (Main menu)

1) S stands for Service Testprogram

yy stands for software version number of uP on Front Board (counted from 01 upwards)

xxxxxx stands for model numbers (NOT APPLICABLE IN SERVICE MODE)


DISPLAY TEST
DEMO Button pressed?
N
Y
Display shows Fig. 1 (DBB & Incredible sound LED lights up - for micro versions)
DEMO Button pressed?
Display shows Fig. 2
DEMO Button pressed?
Display shows Fig. 3
DEMO Button pressed?
Display shows Fig. 4
DEMO Button pressed?
Display shows Fig. 5
DEMO Button pressed?
TUNER TEST
PROGRAM Button pressed?
Display shows Version of Tuner for ccc
Service frequencies are copied to the RAM (see Table1)
Tuner is normal working except for:
PROGRAM and AUTOPROGRAM
Power off?
Service Mode left
QUARTZ TEST
STOP/CLEAR Button pressed?
Display shows 32K Output at pin80 of 7401=2048Hz
STOP/CLEAR Button pressed?
Display shows 8M Output at pin80 of 7401=1953,125Hz
STOP/CLEAR Button pressed?
TAPE TEST
BAND Button pressed?
Display shows 'TAPE'
BAND Button pressed?
CD TEST
PLAY/PAUSE Button pressed?
FOR CD TEST see Chapter 3-6
CD PLAY TEST
STAND BY Button pressed?
CD is in normal PLAY Mode.
In case of failures error codes according table 4 (chapter 3-6) will de displayed.
Various other Tests

The CD PLAY Test is intended to be used for continuously playing a disc in order to detect intermittend or not reproducible failures.
The error code indicates where the failure can be found.

| PRESET | Europe "EUR" | East Europe "EAS" | USA "USA" | Oversea "OSE" | Korea "KOR" |
|---|---|---|---|---|---|
| 1 | 87.5MHz | 65.81MHz | 87.5MHz | 87.5MHz | 87.5MHz |
| 2 | 108MHz | 108MHz | 108MHz | 108MHz | 108MHz |
| 3 | 531kHz | 74MHz | 530kHz | 531/530kHz | 531kHz |
| 4 | 1602kHz | 87.5MHz | 1700kHz | 1602/1700kHz | 1602kHz |
| 5 | 558kHz | 531kHz | 560kHz | 558/560kHz | 558kHz |
| 6 | 1494kHz | 1602kHz | 1500kHz | 1494/1500kHz | 1494kHz |
| 7 | 153kHz | 558kHz | 98.0MHz | 87.5MHz | 87.5MHz |
| 8 | 279kHz | 1494kHz | 87.5MHz | 87.5MHz | 87.5MHz |
| 9 | 198kHz | 153kHz | 87.5MHz | 87.5MHz | 87.5MHz |
| 10 | 98MHz | 279kHz | 87.5MHz | 87.5MHz | 98MHz |
| 11 | 87.5MHz | 198kHz | 87.5MHz | 98MHz | 98MHz |

Table 1

East Europe Tuner IF offset correction

1) Input a reference frequency 87.5MHz from the generator.
2) Proceed to the Tuner Test mode. (Press PROGRAM button).
3) Offset calibration will start to calibrate automatically. (Display will show XX)

XX : offset value

| ***TEST*** | ***Activated with*** | ***ACTION*** |
|---|---|---|
| | | Normal CD play but Errors according table 4 (Chapter 3-6) will be displayed |
| EEPROM TEST | Tuning Down | A testpattern will be sent to the EEPROM. 'PASS' is displayed. Otherwise ERR will be displayed. |
| EEPROM CLEAR | Preset Down | Load default data. Display shows NEW for 1 second.<br>***Caution!***<br>***All presets from the customer are lost!!*** |
| KEY TEST | Preset Up | Key numbers according table 5 are shown on the display. (see Chapter 3-6) |
| FAST CLOCK TEST | DBB | The clock is switched to fast mode. 'FAST' is displayed for 2 sec.<br>Press DBB again to reset the clock to normal. 'NOM' displayed for 2 sec. |
| LEAVE SERVICE TESTPROGRAM | disconnect mains | |

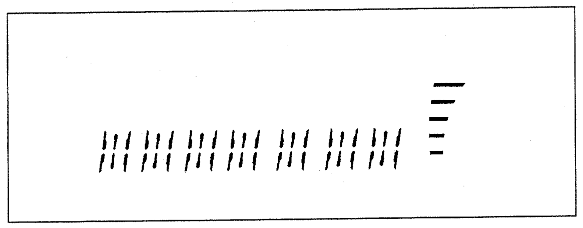


Figure 2

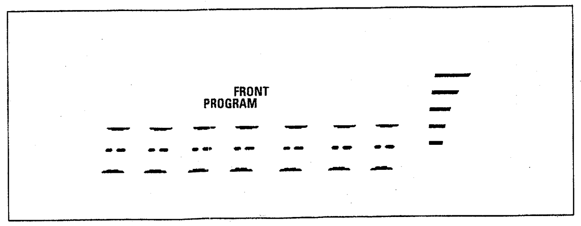

FRONT
PROGRAM

Figure 3

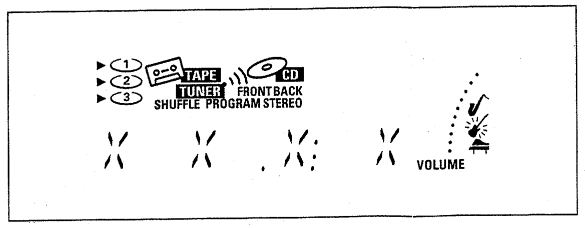

1
2
3
TAPE
CD
TUNER
FRONT BACK
SHUFFLE PROGRAM STEREO
VOLUME

Figure 4

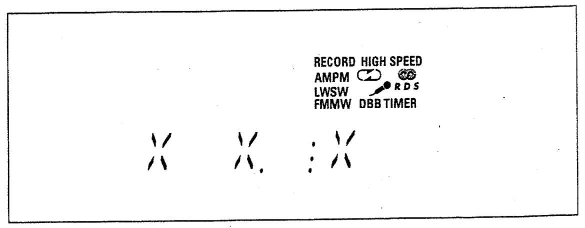

RECORD HIGH SPEED
AMPM
LWSW
RDS
FMMW DBB TIMER

Figure 5

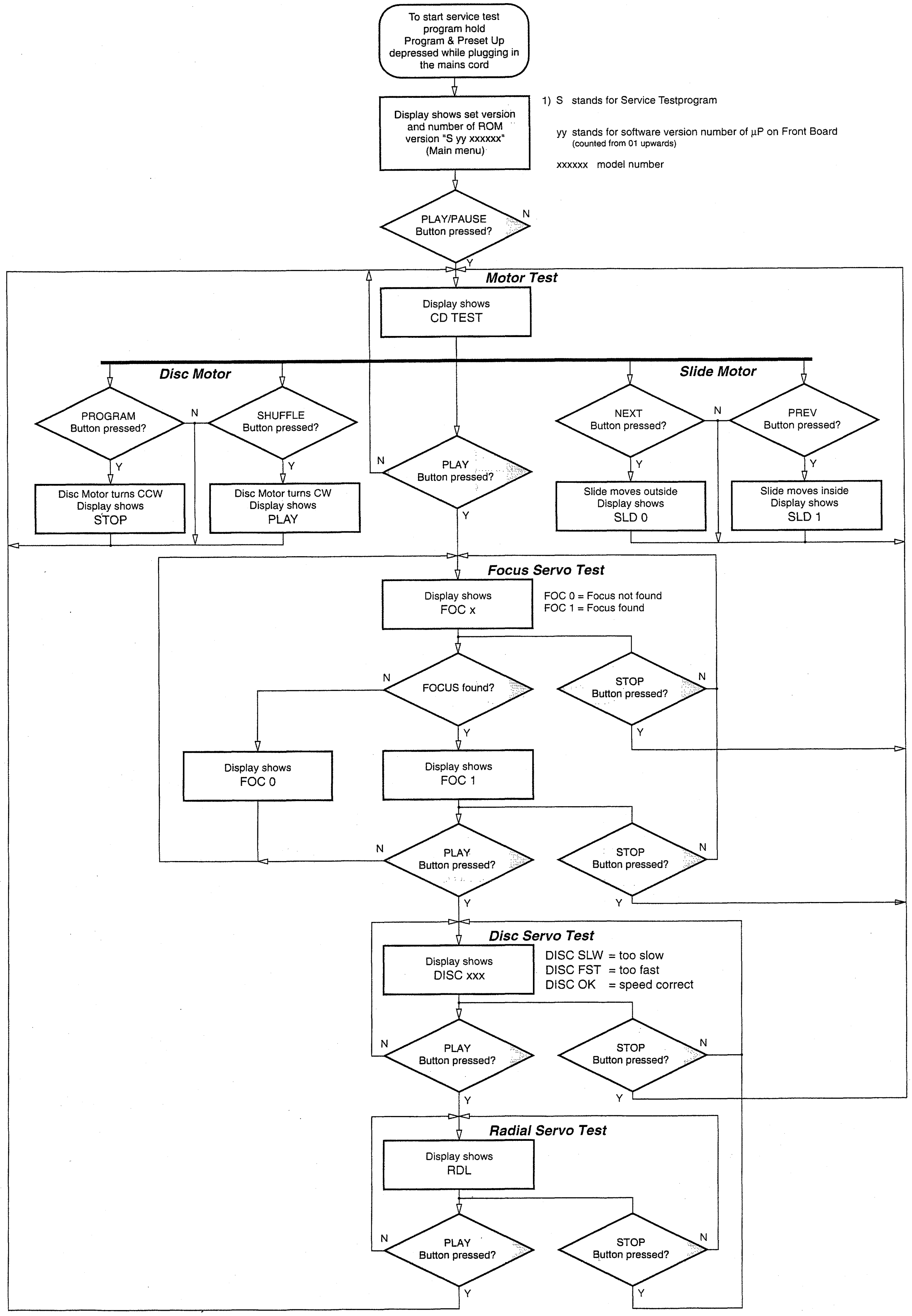
| Error number | CD Error description |
|---|---|
| E 1002 | Focus error<br>Triggered when the focus could not found within a certain time when starting up the CD, or when the focus is lost for more than a certain time during playing the CD. |
| E 1007 | Subcode error (no subcode within certain time) |
| E 1008 | TOC error<br>Triggered when during reading the TOC the lead-in(track nr. 0) is left. This can be caused by a misaligned Inner-switch or by a disc with a mispositioned lead-in. |
| E 1010 | Radial error<br>Triggered when the radial servo is not on track for a certain time during playing the CD. |
| E 1011 | Sledge error<br>Generated when the Inner-switch did not open within a certain time when the pickup is moved to the inner position. |
| E 1012 | Fatal sledge error<br>Triggered when the Inner-switch did not close within a certain time when moving the pickup inside. Inner-switch or sledge motor problem. |
| E 1013 | Turnatble motor error<br>Generated when the CD did not reach 75% of speed during startup within a certain time. Disc motor problem. |
| E 1014 | Jump-offtrack error (too less grooves within time) |
| E 1020 | PLL locked error<br>Triggered when the PLL of the decoder did not locked within a certain time. |
| E 1070 | Carousel blocked in a disc position |
| E 1071 | Carousel blocked in the middle |
| E 1075 | Drawer blocked in the middle |
| E 1076 | Drawer blocked in open or closed state |

**For FW335/FW363**

| Key activated | Display | Key activated | Display | Key activated | Display |
|---|---|---|---|---|---|
| Stop/Clear | 01 | Clock Set | 11 | Incredible Sound | 21 |
| Program (CD) | 02 | Timer Set | 12 | Dbb | 22 |
| Shuffle | 03 | Timer On/Off | 13 | Optimal | 23 |
| Search/Prev | 04 | Demo | 14 | Jazz | 24 |
| Play/Pause | 05 | Tuning Down | 15 | Rock | 25 |
| Search/Next | 06 | Tuning Up | 16 | Pop | 26 |
| CD Open/Close | 07 | Preset Down | 17 | Classic | 27 |
| Program (TU) | 08 | Preset Up | 18 | HSD | 28 |
| Band | 09 | Power/Standby | 19 | any RC keys | RC |
| RDS Mode | 10 | Scroll Source | 20 | | |

**For FW315C/FW340C/FW345C/FW355C/FW365C/FW373C**

| Key activated | Display | Key activated | Display | Key activated | Display |
|---|---|---|---|---|---|
| Stop/Clear | 01 | RDS Mode | 13 | Scroll Source | 25 |
| Program (CDC) | 02 | Clock Set | 14 | Incredible Stereo | 26 |
| Shuffle | 03 | Timer Set | 15 | Dbb | 27 |
| Search/Prev | 04 | Timer On/Off | 16 | Optimal | 28 |
| Play/Pause | 05 | Demo | 17 | Jazz | 29 |
| Search/Next | 06 | Volume Up | 18 | Rock | 30 |
| Disc 1 | 07 | Volume Down | 19 | Pop | 31 |
| Disc 2 | 08 | Tuning Down | 20 | Classic | 32 |
| Disc 3 | 09 | Tuning Up | 21 | HSD | 33 |
| CD Open Close | 10 | Preset Down | 22 | any RC keys | RC |
| Program (TU) | 11 | Preset Up | 23 | | |
| Band | 12 | Power/Standby | 24 | | |

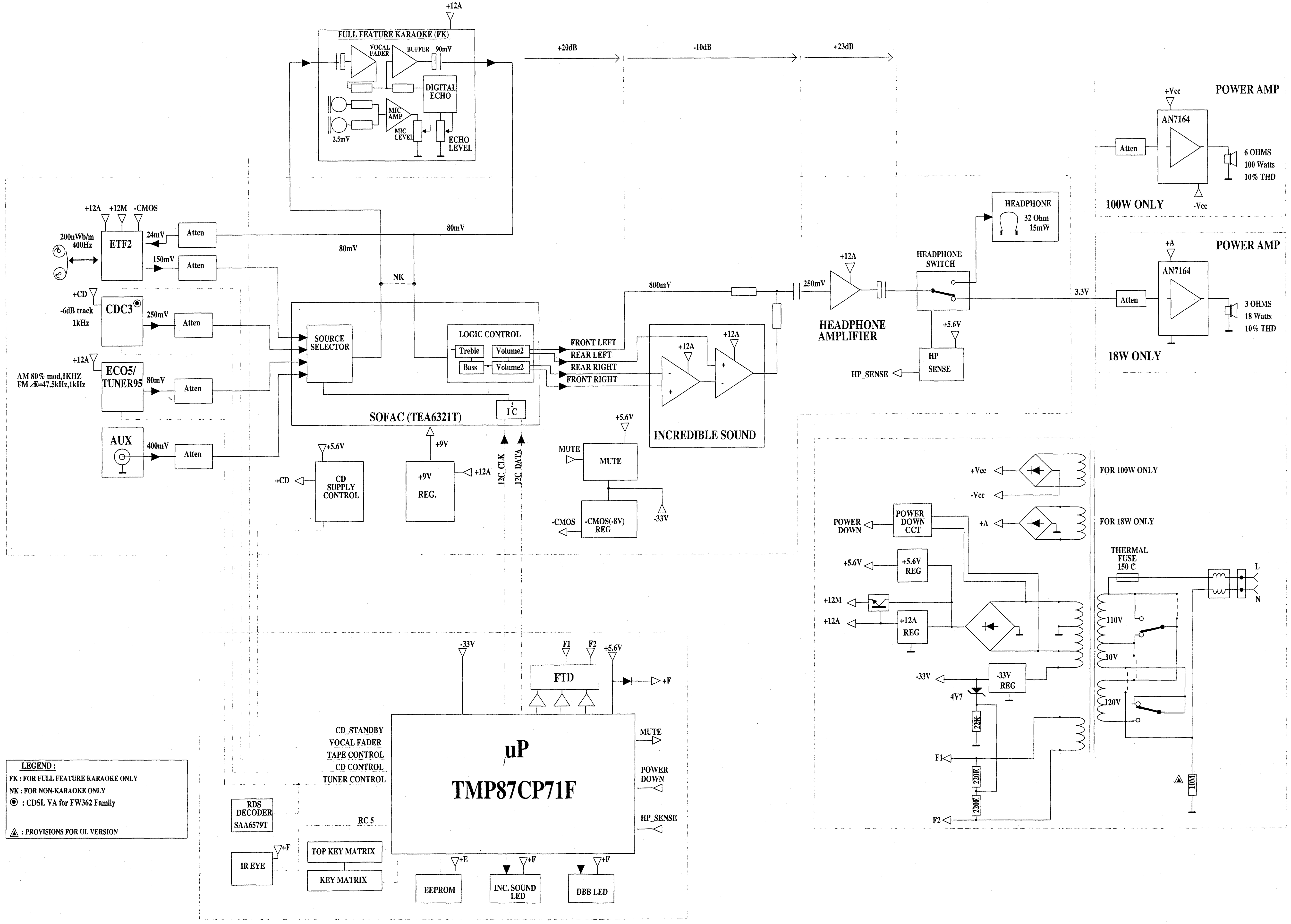

To start service test program hold Program & Preset Up depressed while plugging in the mains cord
Display shows set version and number of ROM version "S yy xxxxxx" (Main menu)
PLAY/PAUSE Button pressed?
N
Y
Motor Test
Display shows CD TEST
Disc Motor
PROGRAM Button pressed?
N
SHUFFLE Button pressed?
Y
Y
Disc Motor turns CCW Display shows STOP
Disc Motor turns CW Display shows PLAY
N
PLAY Button pressed?
Y
Slide Motor
NEXT Button pressed?
N
PREV Button pressed?
Y
Y
Slide moves outside Display shows SLD 0
Slide moves inside Display shows SLD 1
Focus Servo Test
Display shows FOC x
FOC 0 = Focus not found
FOC 1 = Focus found
N
FOCUS found?
Y
STOP Button pressed?
N
Y
Display shows FOC 0
Display shows FOC 1
N
PLAY Button pressed?
Y
STOP Button pressed?
N
Y
Disc Servo Test
Display shows DISC xxx
DISC SLW = too slow
DISC FST = too fast
DISC OK = speed correct
N
PLAY Button pressed?
Y
STOP Button pressed?
N
Y
Radial Servo Test
Display shows RDL
N
PLAY Button pressed?
Y
STOP Button pressed?
N
Y

1) S stands for Service Testprogram

yy stands for software version number of µP on Front Board (counted from 01 upwards)

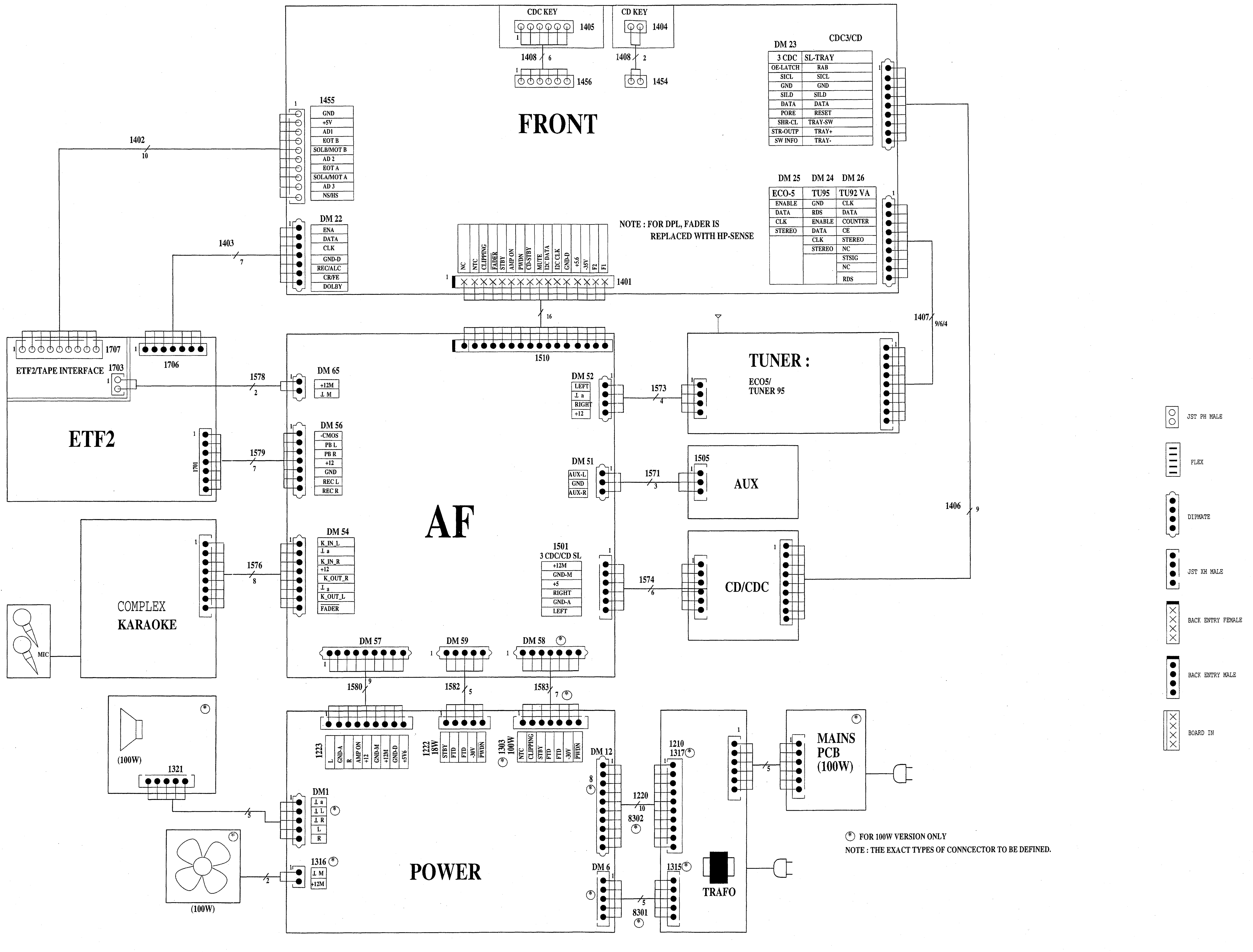
xxxxxx model number

# BLOCK DIAGRAM


+12A
FULL FEATURE KARAOKE (FK)
VOCAL FADER
BUFFER
90mV
DIGITAL ECHO
MIC AMP
MIC LEVEL
ECHO LEVEL
2.5mV
+20dB
-10dB
+23dB
POWER AMP
+Vcc
AN7164
Atten
6 OHMS
100 Watts
10% THD
100W ONLY
-Vcc
+12A
+12M
-CMOS
200nWb/m
400Hz
ETF2
24mV
Atten
150mV
Atten
80mV
80mV
NK
+CD
CDC3
-6dB track
1kHz
250mV
Atten
+12A
ECO5/ TUNER95
AM 80% mod,1KHZ
FM Δf=47.5kHz,1kHz
80mV
Atten
AUX
400mV
Atten
SOURCE SELECTOR
LOGIC CONTROL
Treble
Volume2
Bass
Volume2
I²C
SOFAC (TEA6321T)
FRONT LEFT
REAR LEFT
REAR RIGHT
FRONT RIGHT
800mV
+12A
+12A
INCREDIBLE SOUND
250mV
+12A
HEADPHONE AMPLIFIER
HEADPHONE SWITCH
HEADPHONE
32 Ohm
15mW
+5.6V
HP SENSE
HP_SENSE
3.3V
+A
POWER AMP
AN7164
Atten
3 OHMS
18 Watts
10% THD
18W ONLY
+5.6V
CD SUPPLY CONTROL
+CD
+9V
+9V REG.
+12A
I2C_CLK
I2C_DATA
+5.6V
MUTE
MUTE
-CMOS
-CMOS(-8V) REG
-33V
+Vcc
-Vcc
FOR 100W ONLY
+A
FOR 18W ONLY
POWER DOWN
POWER DOWN CCT
+5.6V
+5.6V REG
+12M
+12A
+12A REG
THERMAL FUSE 150 C
L
N
110V
10V
120V
-33V
-33V REG
4V7
22K
F1
220E
220E
F2
10M
-33V
F1
F2
+5.6V
FTD
+F
CD_STANDBY
VOCAL FADER
TAPE CONTROL
CD CONTROL
TUNER CONTROL
uP
TMP87CP71F
MUTE
POWER DOWN
HP_SENSE
RDS DECODER SAA6579T
RC 5
TOP KEY MATRIX
KEY MATRIX
IR EYE
+F
+E
EEPROM
+F
INC. SOUND LED
+F
DBB LED

LEGEND :
FK : FOR FULL FEATURE KARAOKE ONLY
NK : FOR NON-KARAOKE ONLY
◉ : CDSL VA for FW362 Family
⚠ : PROVISIONS FOR UL VERSION

## WIRING DIAGRAM


CDC KEY
1405
CD KEY
1404
1408 6
1408 2
1456
1454
CDC3/CD
DM 23
3 CDC
SL-TRAY
OE-LATCH RAB
SICL SICL
GND GND
SILD SILD
DATA DATA
PORE RESET
SHR-CL TRAY-SW
STR-OUTP TRAY+
SW INFO TRAY-
FRONT
1455
GND
+5V
AD1
EOT B
SOLB/MOT B
AD 2
EOT A
SOLA/MOT A
AD 3
NS/HS
1402
10
DM 22
ENA
DATA
CLK
GND-D
REC/ALC
CR/FE
DOLBY
1403
7
NC
NTC
CLIPPING
FADER
STBY
AMP ON
PWDN
CD-STBY
MUTE
I2C DATA
I2C CLK
GND-D
+5.6
-35V
F2
F1
1401
NOTE : FOR DPL, FADER IS
REPLACED WITH HP-SENSE
DM 25
DM 24
DM 26
ECO-5
TU95
TU92 VA
ENABLE GND CLK
DATA RDS DATA
CLK ENABLE COUNTER
STEREO DATA CE
CLK STEREO
STEREO NC
STSIG
NC
RDS
16
1407
9/6/4
1707
1706
ETF2/TAPE INTERFACE
1703
1510
TUNER :
ECO5/
TUNER 95
DM 65
+12M
⊥ M
1578
2
DM 52
LEFT
⊥ a
RIGHT
+12
1573
4
ETF2
1701
DM 56
-CMOS
PB L
PB R
+12
GND
REC L
REC R
1579
7
DM 51
AUX-L
GND
AUX-R
1571
3
1505
AUX
1406
9
AF
COMPLEX
KARAOKE
DM 54
K_IN_L
⊥ a
K_IN_R
+12
K_OUT_R
⊥ a
K_OUT_L
FADER
1576
8
1501
3 CDC/CD SL
+12M
GND-M
+5
RIGHT
GND-A
LEFT
1574
6
CD/CDC
MIC
DM 57
DM 59
DM 58 ⊛
1580
9
1582
5
1583
7 ⊛
⊛
(100W)
1321
1223
L
GND-A
R
AMP ON
+12
GND-M
+12M
GND-D
+5V6
1222
18W
STBY
FTD
FTD
-30V
PWDN
1303
100W
⊛
NTC
CLIPPING
STBY
FTD
FTD
-30V
PWDN
DM 12
8
⊛
1220
10
8302
⊛
1210
1317⊛
5
MAINS
PCB
(100W)
⊛
DM1
⊥ a
⊥ L
⊥ R
L
R
⊛
5
1316 ⊛
⊥ M
+12M
2
⊛
(100W)
POWER
DM 6
⊛
5
8301
⊛
1315⊛
TRAFO
JST PH MALE
FLEX
DIPMATE
JST XH MALE
BACK ENTRY FEMALE
BACK ENTRY MALE
BOARD IN

⊛ FOR 100W VERSION ONLY

NOTE : THE EXACT TYPES OF CONNCECTOR TO BE DEFINED.

# FRONT BOARD

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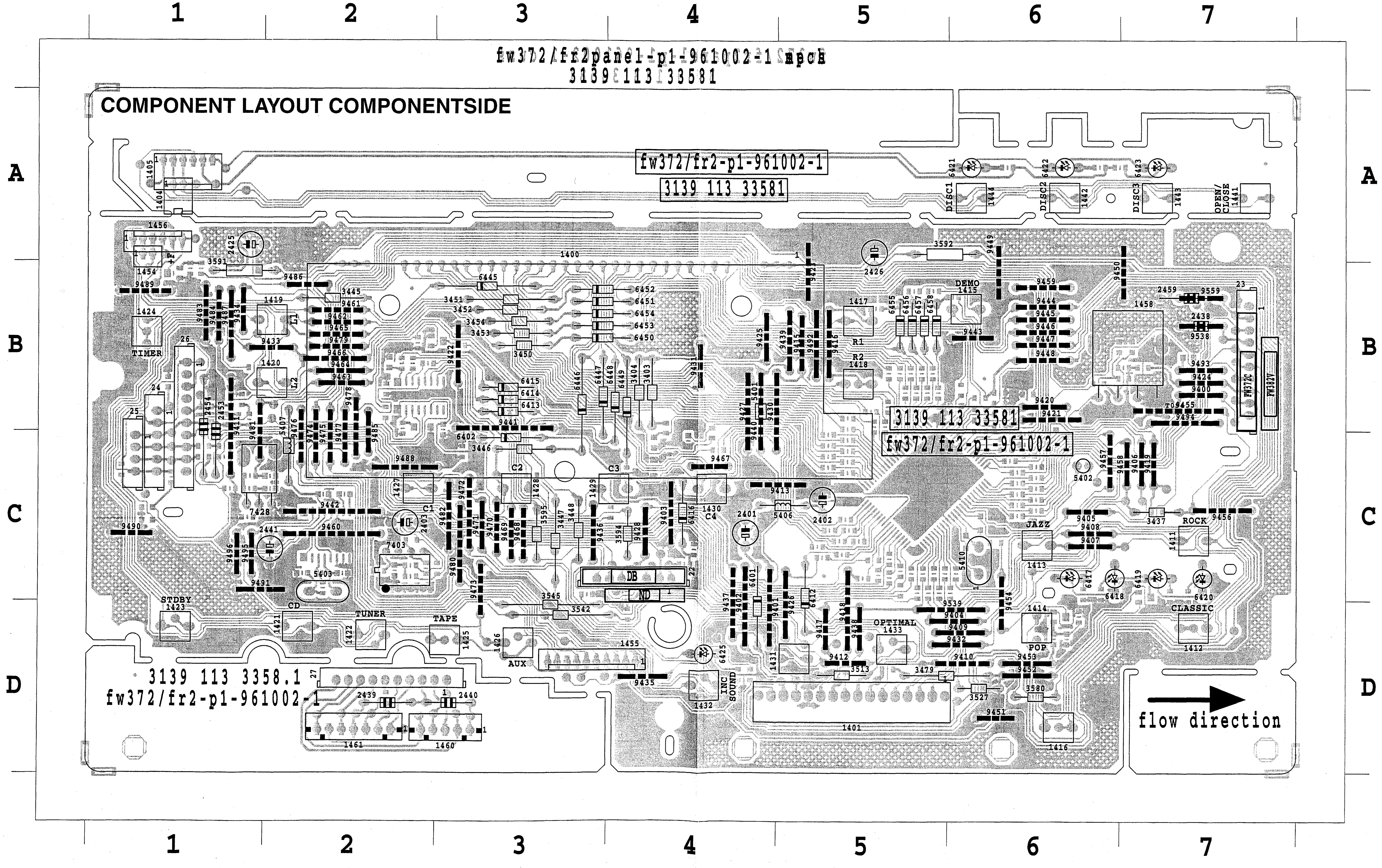
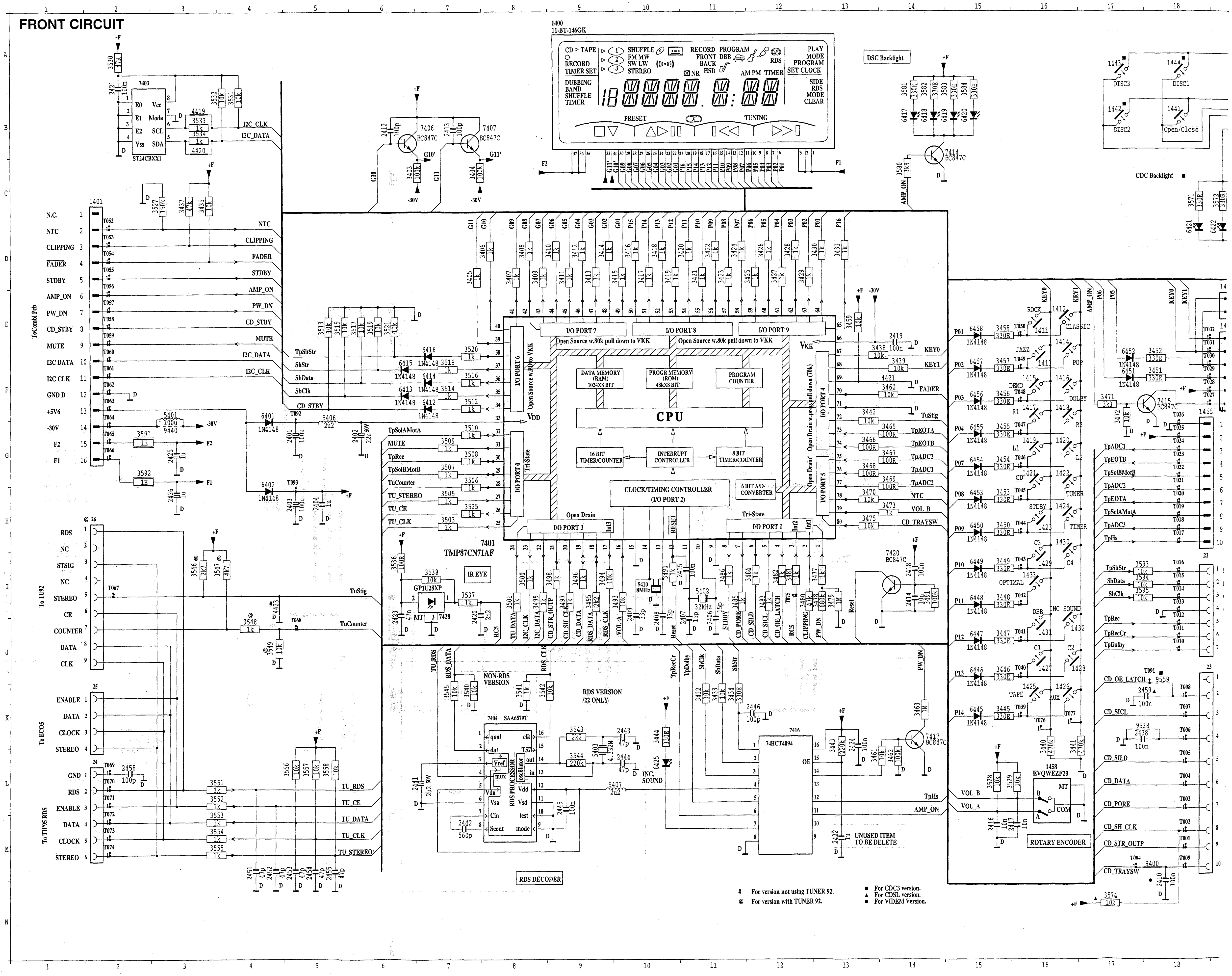
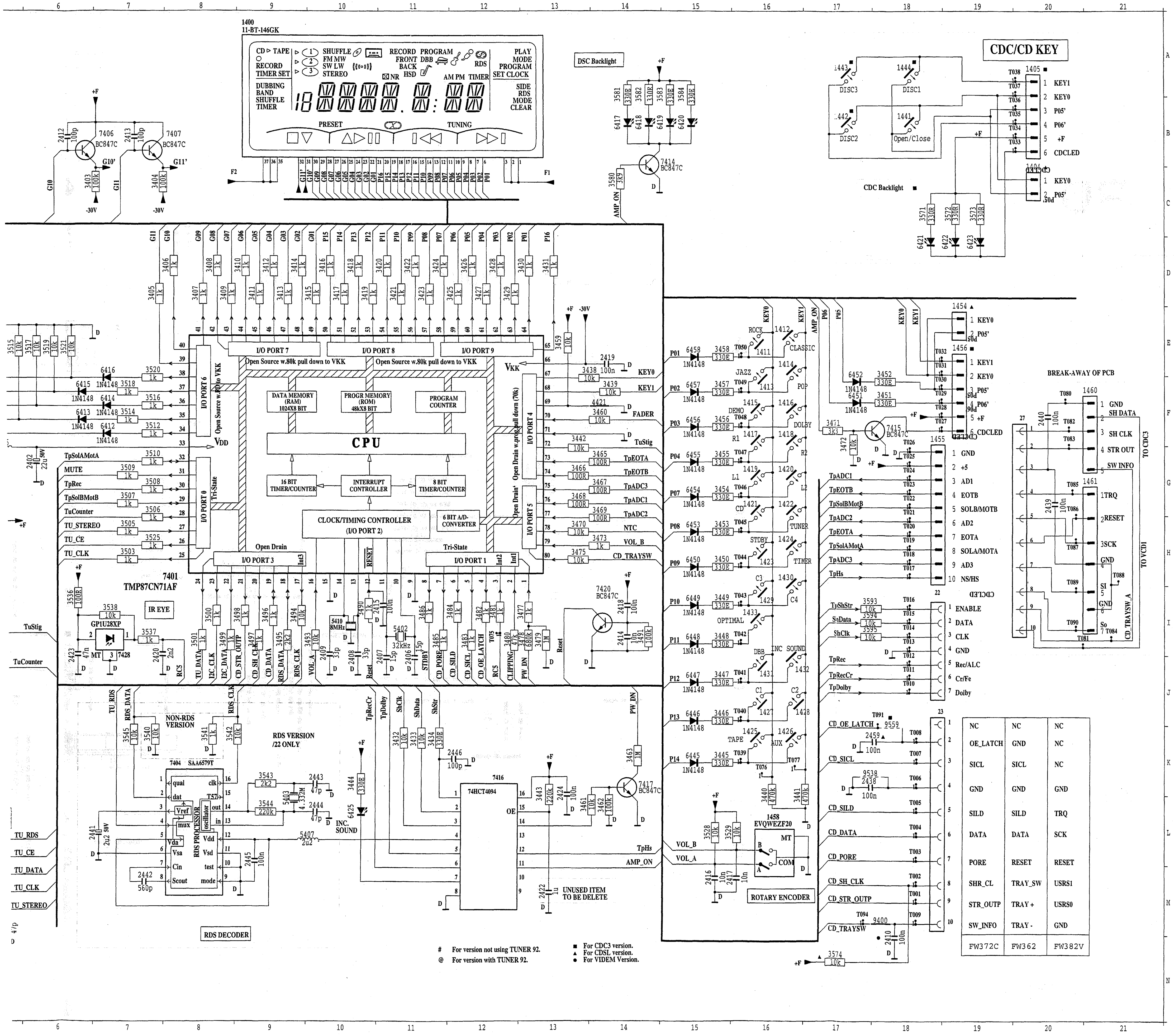
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 C 4 | 1416 D 6 | 1428 C 3 | 1456 A 1 | 2441 C 2 | 3451 B 3 | 3594 C 4 | 6414 B 3 | 6446 B 3 | 6458 B 5 | 9409 D 6 | 9422 B 3 | 9435 D 4 | 9447 B 6 | 9459 B 6 | 9471 C 3 | 9483 B 1 | 9495 C 1 |
| 23 B 7 | 1417 B 5 | 1429 C 4 | 1458 B 7 | 2453 C 1 | 3452 B 3 | 3595 C 3 | 6415 B 3 | 6447 B 3 | 7403 C 2 | 9410 D 6 | 9423 B 5 | 9436 C 3 | 9448 B 6 | 9460 C 2 | 9472 C 3 | 9484 B 1 | 9496 C 1 |
| 24 C 1 | 1418 B 5 | 1430 C 4 | 1460 D 3 | 2454 B 1 | 3453 B 3 | 5401 B 4 | 6416 C 4 | 6448 B 4 | 7428 C 1 | 9411 B 1 | 9424 B 7 | 9437 D 4 | 9449 B 6 | 9461 B 2 | 9473 C 3 | 9485 C 2 | 9538 B 7 |
| 1400 B 3 | 1419 B 2 | 1431 D 5 | 1461 D 2 | 2459 B 7 | 3454 B 3 | 5402 C 6 | 6417 C 6 | 6449 B 4 | 9400 B 7 | 9412 D 5 | 9425 B 4 | 9438 D 5 | 9450 B 7 | 9462 B 2 | 9474 C 2 | 9486 B 2 | 9539 D 6 |
| 1401 D 5 | 1420 B 2 | 1432 D 4 | 2401 C 4 | 3403 B 4 | 3479 D 5 | 5403 C 2 | 6418 C 6 | 6450 B 3 | 9401 D 4 | 9413 C 5 | 9426 D 5 | 9439 B 5 | 9451 D 6 | 9463 B 2 | 9475 C 2 | 9487 B 1 | 9559 B 7 |
| 1404 A 1 | 1421 D 2 | 1433 D 5 | 2402 C 5 | 3404 B 4 | 3513 D 5 | 5406 C 5 | 6419 C 7 | 6451 B 3 | 9402 D 4 | 9415 B 5 | 9427 B 4 | 9440 B 4 | 9452 D 6 | 9464 B 2 | 9476 C 2 | 9488 C 2 | ---- |
| 1405 A 1 | 1422 D 2 | 1441 A 7 | 2403 C 2 | 3437 C 7 | 3527 D 6 | 5407 C 2 | 6420 C 7 | 6452 B 3 | 9403 C 4 | 9416 B 5 | 9428 C 4 | 9441 B 3 | 9453 D 6 | 9465 B 2 | 9477 C 2 | 9489 B 1 | |
| 1411 C 7 | 1423 D 1 | 1442 A 6 | 2425 A 1 | 3445 B 2 | 3542 D 3 | 5410 C 6 | 6421 A 6 | 6453 B 3 | 9404 D 6 | 9417 D 5 | 9430 B 4 | 9442 C 2 | 9454 D 6 | 9466 B 2 | 9478 B 2 | 9490 C 1 | |
| 1412 D 7 | 1424 B 1 | 1443 A 7 | 2426 A 5 | 3446 C 3 | 3545 D 3 | 6401 D 4 | 6422 A 6 | 6454 B 3 | 9405 C 6 | 9418 D 5 | 9431 B 4 | 9443 B 6 | 9455 B 7 | 9467 C 4 | 9479 B 2 | 9491 C 1 | |
| 1413 C 6 | 1425 D 3 | 1444 A 6 | 2438 B 7 | 3447 C 3 | 3580 D 6 | 6402 C 3 | 6423 A 7 | 6455 B 5 | 9406 C 7 | 9419 C 7 | 9432 D 6 | 9444 B 6 | 9456 C 7 | 9468 C 3 | 9480 C 3 | 9492 B 5 | |
| 1414 D 6 | 1426 D 3 | 1454 A 1 | 2439 D 2 | 3448 C 3 | 3591 B 1 | 6412 C 5 | 6425 D 4 | 6456 B 5 | 9407 C 6 | 9420 B 6 | 9433 B 2 | 9445 B 6 | 9457 C 6 | 9469 C 3 | 9481 C 1 | 9493 B 7 | |
| 1415 B 6 | 1427 C 2 | 1455 D 3 | 2440 D 3 | 3450 B 3 | 3592 A 5 | 6413 B 3 | 6445 B 3 | 6457 B 5 | 9408 C 6 | 9421 B 6 | 9434 B 1 | 9446 B 6 | 9458 C 7 | 9470 C 3 | 9482 C 3 | 9494 B 7 | |


1
2
3
4
5
6
7
A
B
C
D
fw372/fr2panel-p1-961002-1 mpch
3139 113 33581
COMPONENT LAYOUT COMPONENTSIDE
fw372/fr2-p1-961002-1
3139 113 33581
DISC1
DISC2
DISC3
OPEN/CLOSE
TIMER
DEMO
R1
R2
FW372C
FW382V
3139 113 33581
fw372/fr2-p1-961002-1
C1
C2
C3
C4
JAZZ
ROCK
CLASSIC
POP
OPTIMAL
STDBY
CD
TUNER
TAPE
AUX
INC SOUND
DB
ND
3139 113 3358.1
fw372/fr2-p1-961002-1
flow direction

# FRONT CIRCUIT


1400
11-BT-146GK
CD▷ TAPE
RECORD
TIMER SET
SHUFFLE
FM MW
SW LW
STEREO
RECORD PROGRAM
FRONT DBB
BACK
HSD
NR
AM PM TIMER
RDS
PLAY
MODE
PROGRAM
SET CLOCK
DUBBING
BAND
SHUFFLE
TIMER
SIDE
RDS
MODE
CLEAR
PRESET
TUNING
7403
ST24CBXX1
I2C_CLK
I2C_DATA
7406
BC847C
7407
BC847C
G10
G11
-30V
1401
N.C.
NTC
CLIPPING
FADER
STDBY
AMP_ON
PW_DN
CD_STBY
MUTE
I2C DATA
I2C CLK
GND D
+5V6
-30V
F2
F1
To Combi Pcb
7401
TMP87CN71AF
CPU
I/O PORT 7
I/O PORT 8
I/O PORT 9
I/O PORT 6
I/O PORT 0
I/O PORT 4
I/O PORT 5
I/O PORT 3
I/O PORT 1
DATA MEMORY (RAM) 1024X8 BIT
PROGR MEMORY (ROM) 48KX8 BIT
PROGRAM COUNTER
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
6 BIT A/D-CONVERTER
Open Source w.80k pull down to VKK
Open Drain
Tri-State
VDD
VKK
IR EYE
GP1U28XP
7428
DSC Backlight
7414
BC847C
AMP_ON
CDC Backlight
DISC3
DISC1
DISC2
Open/Close
KEY0
KEY1
FADER
TuStig
TpEOTA
TpEOTB
TpADC1
TpADC2
NTC
VOL_B
CD_TRAYSW
ROCK
CLASSIC
JAZZ
POP
DEMO
DOLBY
R1
R2
L1
L2
CD
TUNER
STDBY
TIMER
C3
C4
OPTIMAL
DBB
INC SOUND
C1
C2
TAPE
AUX
1458
EVQWEZF20
ROTARY ENCODER
VOL_B
VOL_A
7415
BC847C
1455
TpADC1
TpEOTB
TpSolBMotB
TpADC2
TpEOTA
TpSolAMotA
TpADC3
TpHs
TpShStr
ShData
ShClk
TpRec
TpRecCr
TpDolby
CD_OE_LATCH
CD_SICL
CD_SILD
CD_DATA
CD_PORE
CD_SH_CLK
CD_STR_OUTP
CD_TRAYSW
RDS
NC
STSIG
NC
STEREO
CE
COUNTER
DATA
CLK
To TU92
TuStig
TuCounter
ENABLE
DATA
CLOCK
STEREO
To ECO5
GND
RDS
ENABLE
DATA
CLOCK
STEREO
To TU95 RDS
TU_RDS
TU_CE
TU_DATA
TU_CLK
TU_STEREO
NON-RDS VERSION
RDS VERSION /22 ONLY
7404 SAA6579T
RDS PROCESSOR
RDS DECODER
INC. SOUND
7416
74HCT4094
OE
7417
BC847C
TpHs
AMP_ON
7420
BC847C
UNUSED ITEM TO BE DELETE
# For version not using TUNER 92.
@ For version with TUNER 92.
■ For CDC3 version.
▲ For CDSL version.
● For VIDEM Version.


1400
11-BT-146GK
CD ▷ TAPE
RECORD
TIMER SET
DUBBING
BAND
SHUFFLE
TIMER
SHUFFLE
FM MW
SW LW
STEREO
RECORD PROGRAM
FRONT DBB
BACK
HSD
NR
AM PM TIMER
PLAY
MODE
PROGRAM
SET CLOCK
RDS
SIDE
RDS
MODE
CLEAR
PRESET
TUNING
DSC Backlight
CDC Backlight
CDC/CD KEY
DISC3
DISC1
DISC2
Open/Close
KEY1
KEY0
P05'
P06'
+F
CDCLED
7401
TMP87CN71AF
CPU
I/O PORT 7
I/O PORT 8
I/O PORT 9
I/O PORT 6
I/O PORT 0
I/O PORT 3
I/O PORT 1
I/O PORT 4
I/O PORT 5
DATA MEMORY (RAM) 1024X8 BIT
PROGR MEMORY (ROM) 48KX8 BIT
PROGRAM COUNTER
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
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Open Source w.80k pull down to VKK
IR EYE
GP1U28XP
RDS DECODER
NON-RDS VERSION
RDS VERSION /22 ONLY
7404 SAA6579T
RDS PROCESSOR
74HCT4094
7416
INC. SOUND
UNUSED ITEM TO BE DELETE
ROTARY ENCODER
1458 EVQWEZF20
ROCK
CLASSIC
JAZZ
POP
DEMO
DOLBY
R1
R2
L1
L2
CD
TUNER
STDBY
TIMER
C3
C4
OPTIMAL
DBB
INC SOUND
C1
C2
TAPE
AUX
BREAK-AWAY OF PCB
TO CDC3
TO VCD1
GND
SH DATA
SH CLK
STR OUT
SW INFO
TRQ
RESET
SCK
ENABLE
DATA
CLK
Rec/ALC
Cr/Fe
Dolby
NS/HS
CDCLED

| FW372C | FW362 | FW382V |
|---|---|---|
| NC | NC | NC |
| OE_LATCH | GND | NC |
| SICL | SICL | NC |
| GND | GND | GND |
| SILD | SILD | TRQ |
| DATA | DATA | SCK |
| PORE | RESET | RESET |
| SHR_CL | TRAY_SW | USRS1 |
| STR_OUTP | TRAY + | USRS0 |
| SW_INFO | TRAY - | GND |

# For version not using TUNER 92.
@ For version with TUNER 92.

■ For CDC3 version.
▲ For CDSL version.
● For VIDEM Version.

| | | | |
|---|---|---|---|
| 1400 | A 9 | 3478 | I13 |
| 1401 | C 2 | 3479 | I13 |
| 1404 | C20 | 3480 | I12 |
| 1405 | A20 | 3481 | I12 |
| 1411 | E16 | 3482 | I12 |
| 1412 | E16 | 3483 | I12 |
| 1413 | F16 | 3484 | I12 |
| 1414 | E16 | 3485 | I11 |
| 1415 | F16 | 3486 | I11 |
| 1416 | F16 | 3490 | I10 |
| 1417 | F16 | 3491 | I14 |
| 1418 | F16 | 3493 | I10 |
| 1419 | G16 | 3494 | I 9 |
| 1420 | G16 | 3495 | I 9 |
| 1421 | G16 | 3496 | I 9 |
| 1422 | G16 | 3497 | I 9 |
| 1423 | H16 | 3498 | I 9 |
| 1424 | H16 | 3499 | I 8 |
| 1425 | K16 | 3500 | I 8 |
| 1426 | K16 | 3501 | I 8 |
| 1427 | J16 | 3503 | H 7 |
| 1428 | J16 | 3505 | H 7 |
| 1429 | I16 | 3506 | G 7 |
| 1430 | H16 | 3507 | G 7 |
| 1431 | J16 | 3508 | G 7 |
| 1432 | J16 | 3509 | G 7 |
| 1433 | I16 | 3510 | G 7 |
| 1441 | B18 | 3512 | F 7 |
| 1442 | B17 | 3513 | E 5 |
| 1443 | A17 | 3514 | F 7 |
| 1444 | A18 | 3515 | E 5 |
| 1454 | E19 | 3516 | F 7 |
| 1455 | F19 | 3517 | E 6 |
| 1456 | E19 | 3518 | F 7 |
| 1458 | L16 | 3519 | E 6 |
| 1460 | F20 | 3520 | E 7 |
| 1461 | G20 | 3521 | E 6 |
| 22 | I18 | 3525 | H 7 |
| 23 | J18 | 3527 | C 3 |
| 24 | L 2 | 3528 | L15 |
| 2401 | G 5 | 3529 | L15 |
| 2402 | G 6 | 3530 | A 2 |
| 2403 | H 5 | 3531 | B 4 |
| 2404 | H 5 | 3532 | B 3 |
| 2406 | J11 | 3533 | B 3 |
| 2407 | J11 | 3534 | B 3 |
| 2408 | J10 | 3536 | I 6 |
| 2409 | I10 | 3537 | I 7 |
| 2410 | N18 | 3538 | I 7 |
| 2412 | B 6 | 3540 | K 7 |
| 2413 | B 7 | 3541 | K 8 |
| 2414 | I14 | 3542 | K 8 |
| 2415 | I11 | 3543 | K 9 |
| 2416 | M15 | 3544 | L 9 |
| 2417 | M15 | 3545 | K 7 |
| 2418 | I14 | 3546 | I 3 |
| 2419 | E14 | 3547 | I 3 |
| 2420 | I 7 | 3548 | J 4 |
| 2421 | A 2 | 3549 | J 4 |
| 2422 | M13 | 3551 | L 3 |
| 2423 | I 6 | 3552 | L 3 |
| 2424 | K13 | 3553 | M 3 |
| 2425 | G 3 | 3554 | M 3 |
| 2426 | H 3 | 3555 | M 3 |
| 2438 | K17 | 3556 | L 4 |
| 2439 | G20 | 3557 | L 5 |
| 2440 | F20 | 3558 | L 5 |
| 2441 | L 7 | 3571 | C18 |
| 2442 | M 7 | 3572 | C19 |
| 2443 | K10 | 3573 | C19 |
| 2444 | L10 | 3574 | N17 |
| 2445 | L 9 | 3580 | C14 |
| 2446 | K12 | 3581 | A14 |
| 2451 | M 4 | 3582 | A14 |
| 2452 | M 4 | 3583 | A14 |
| 2453 | M 5 | 3584 | A15 |
| 2454 | M 5 | 3591 | G 2 |
| 2455 | M 5 | 3592 | G 2 |
| 2458 | L 2 | 3593 | I17 |
| 2459 | K18 | 3594 | I17 |
| 25 | K 2 | 3595 | I17 |
| 26 | H 2 | 4419 | B 3 |
| 27 | F20 | 4420 | B 3 |
| 3403 | C 6 | 4421 | F14 |
| 3404 | C 7 | 4423 | I 4 |
| 3405 | D 7 | 5401 | F 3 |
| 3406 | D 8 | 5402 | I11 |
| 3407 | D 8 | 5403 | L 9 |
| 3408 | D 8 | 5406 | F 5 |
| 3409 | D 8 | 5407 | L10 |
| 3410 | D 9 | 5410 | I10 |
| 3411 | D 9 | 6401 | F 4 |
| 3412 | D 9 | 6402 | H 4 |
| 3413 | D 9 | 6412 | F 7 |
| 3414 | D 9 | 6413 | F 6 |
| 3415 | D10 | 6414 | F 7 |
| 3416 | D10 | 6415 | F 6 |
| 3417 | D10 | 6416 | E 7 |
| 3418 | D10 | 6417 | B14 |
| 3419 | D10 | 6418 | B14 |
| 3420 | D11 | 6419 | B14 |
| 3421 | D11 | 6420 | B15 |
| 3422 | D11 | 6421 | D18 |
| 3423 | D11 | 6422 | D19 |
| 3424 | D11 | 6423 | D19 |
| 3425 | D12 | 6425 | L10 |
| 3426 | D12 | 6445 | K15 |
| 3427 | D12 | 6446 | J15 |
| 3428 | D12 | 6447 | J15 |
| 3429 | D12 | 6448 | I15 |
| 3430 | D13 | 6449 | I15 |
| 3431 | D13 | 6450 | H15 |
| 3432 | K11 | 6451 | F17 |
| 3433 | K11 | 6452 | F17 |
| 3434 | K11 | 6453 | H15 |
| 3435 | C 3 | 6454 | G15 |
| 3437 | C 3 | 6455 | G15 |
| 3438 | E13 | 6456 | F15 |
| 3439 | F14 | 6457 | F15 |
| 3440 | K16 | 6458 | E15 |
| 3441 | K16 | 7401 | H 8 |
| 3442 | F13 | 7403 | A 2 |
| 3443 | K13 | 7404 | K 8 |
| 3444 | K10 | 7406 | B 7 |
| 3445 | K15 | 7407 | B 8 |
| 3446 | J15 | 7414 | B14 |
| 3447 | J15 | 7415 | F18 |
| 3448 | I15 | 7416 | K12 |
| 3449 | I15 | 7417 | K14 |
| 3450 | H15 | 7420 | I14 |
| 3451 | F18 | 7428 | J 7 |
| 3452 | E18 | 9400 | M18 |
| 3453 | H15 | 9440 | G 3 |
| 3454 | G15 | 9538 | K17 |
| 3455 | G15 | 9559 | K18 |
| 3456 | F15 | | |
| 3457 | F15 | | |
| 3458 | E15 | | |
| 3459 | E13 | | |
| 3460 | F14 | | |
| 3461 | L13 | | |
| 3462 | L14 | | |
| 3463 | K14 | | |
| 3465 | G14 | | |
| 3466 | G13 | | |
| 3467 | G14 | | |
| 3468 | G13 | | |
| 3469 | G14 | | |
| 3470 | H13 | | |
| 3471 | F17 | | |
| 3472 | F17 | | |
| 3473 | H14 | | |
| 3475 | H13 | | |
| 3477 | I13 | | |

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| 2407 | C | 6 |
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| 2409 | C | 6 |
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| 2422 | B | 2 |
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| 2445 | C | 2 |
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| 3407 | C | 5 |
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| 3412 | C | 5 |
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| 3414 | C | 5 |
| 3415 | B | 5 |
| 3416 | B | 5 |
| 3417 | B | 5 |
| 3418 | B | 5 |
| 3419 | B | 5 |
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| 3424 | B | 5 |
| 3425 | B | 5 |
| 3426 | B | 5 |
| 3427 | B | 5 |
| 3428 | B | 5 |
| 3429 | B | 5 |
| 3430 | B | 5 |
| 3431 | B | 6 |
| 3432 | B | 2 |
| 3433 | B | 2 |
| 3434 | B | 2 |
| 3435 | C | 7 |
| 3438 | B | 6 |
| 3439 | B | 6 |
| 3440 | B | 6 |
| 3441 | B | 6 |
| 3442 | C | 6 |
| 3443 | B | 2 |
| 3444 | D | 4 |
| 3449 | C | 4 |
| 3455 | B | 5 |
| 3456 | B | 5 |
| 3457 | B | 5 |
| 3458 | B | 6 |
| 3459 | B | 6 |
| 3460 | B | 6 |
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| 3463 | B | 3 |
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| 3466 | C | 6 |
| 3467 | C | 6 |
| 3468 | C | 6 |
| 3469 | C | 6 |
| 3470 | C | 6 |
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| 3472 | B | 1 |
| 3473 | C | 6 |
| 3475 | C | 6 |
| 3477 | C | 6 |
| 3478 | D | 5 |
| 3480 | C | 6 |
| 3481 | C | 6 |
| 3482 | C | 6 |
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| 3490 | C | 6 |
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| 3493 | C | 6 |
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| 3505 | C | 5 |
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| 3512 | C | 5 |
| 3514 | C | 5 |
| 3515 | B | 3 |
| 3516 | C | 5 |
| 3517 | B | 3 |
| 3518 | C | 5 |
| 3519 | B | 3 |
| 3520 | C | 5 |
| 3521 | C | 4 |
| 3525 | C | 5 |
| 3528 | B | 7 |
| 3529 | B | 7 |
| 3530 | C | 2 |
| 3531 | C | 2 |
| 3532 | C | 2 |
| 3533 | C | 2 |
| 3534 | C | 3 |
| 3536 | C | 1 |
| 3537 | C | 1 |
| 3538 | C | 1 |
| 3540 | C | 3 |
| 3541 | D | 4 |
| 3543 | C | 2 |
| 3544 | C | 2 |
| 3546 | B | 1 |
| 3547 | B | 1 |
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| 3552 | B | 1 |
| 3553 | C | 1 |
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| 3572 | A | 6 |
| 3573 | A | 6 |
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| 3581 | C | 6 |
| 3582 | C | 6 |
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| 3584 | C | 7 |
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| 4401 | C | 4 |
| 4402 | B | 4 |
| 4418 | C | 6 |
| 4419 | C | 2 |
| 4420 | C | 3 |
| 4421 | B | 6 |
| 4422 | C | 1 |
| 4423 | B | 6 |
| 4424 | C | 3 |
| 4425 | B | 6 |
| 4426 | B | 6 |
| 4427 | D | 4 |
| 4430 | B | 1 |
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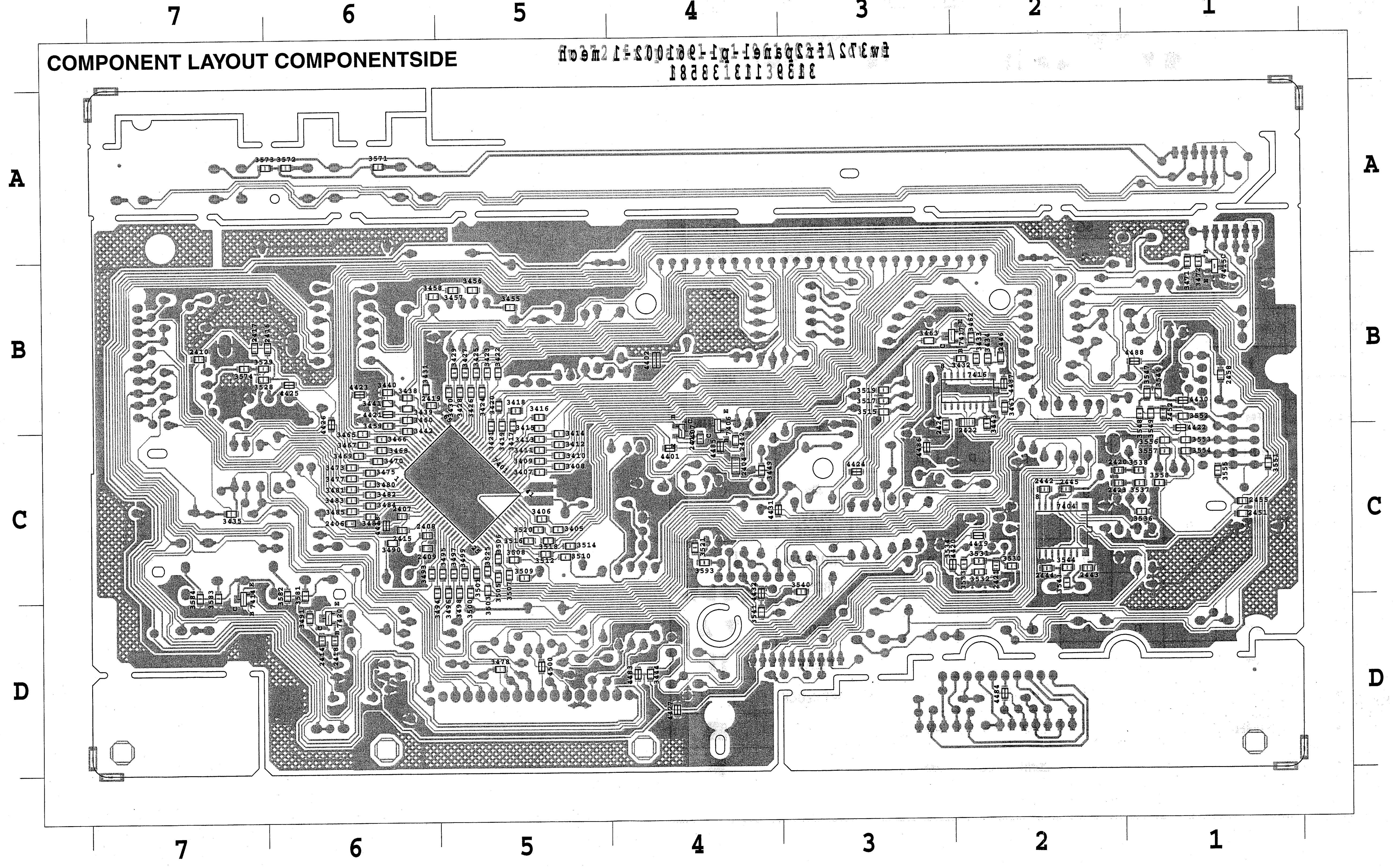
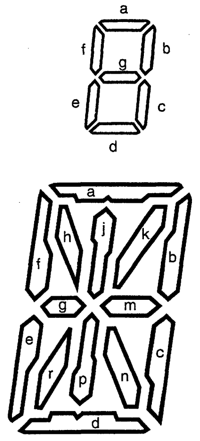
| 4432 | C | 4 |
| 4483 | D | 4 |
| 4484 | D | 2 |
| 4485 | C | 4 |
| 4486 | C | 3 |
| 4487 | B | 2 |
| 4488 | B | 1 |
| 4500 | D | 5 |
| 7401 | C | 5 |
| 7404 | C | 2 |
| 7406 | B | 4 |
| 7407 | C | 4 |
| 7414 | C | 7 |
| 7415 | B | 1 |
| 7416 | B | 2 |
| 7417 | B | 3 |
| 7420 | D | 6 |
| ---- | | |

## COMPONENT LAYOUT COMPONENTSIDE




a
b
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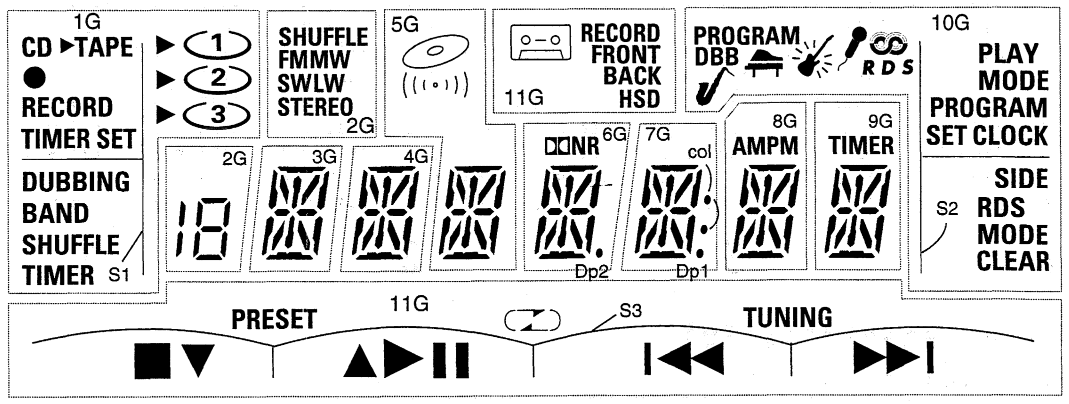

1G
CD ▶TAPE
●
RECORD
TIMER SET
DUBBING
BAND
SHUFFLE
TIMER
S1
▶ 1
▶ 2
▶ 3
SHUFFLE
FMMW
SWLW
STEREO
2G
5G
((•))
RECORD
FRONT
BACK
HSD
11G
PROGRAM
DBB
RDS
10G
PLAY
MODE
PROGRAM
SET CLOCK
SIDE
S2
RDS
MODE
CLEAR
2G
3G
4G
DDNR
6G
7G
col
8G
AMPM
9G
TIMER
Dp2
Dp1
PRESET
11G
S3
TUNING
■▼
▲▶❚❚
❙◀◀
▶▶❙

| | 1G | 2G | 3G | 4G | 5G | 6G | 7G | 8G | 9G | 10G | 11G |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P1 | CD ▶TAPE | a | a | a | a | a | a | a | a | PROGRAM | FRONT |
| P2 | ●<br>RECORD | b | b | b | b | b | b | b | b | RDS | BACK |
| P3 | TIMER SET | f | f | f | f | f | f | f | f | 🎤 | RECORD |
| P4 | DUBBING | ¦ | h | h | h | h | h | h | h | 🎷 | HSD |
| P5 | BAND | FM | k | k | k | k | k | k | k | 🎸 | PRESET TUNING |
| P6 | SHUFFLE | SHUFFLE | j , p | j , p | j , p | j , p | j , p | j , p | j , p | ✨ | Z |
| P7 | TIMER | g | g | g | g | g | g | g | g | 🎹 | ( |
| P8 | 1 2 3 | MW | m | m | m | m | m | m | m | PLAY MODE | ) |
| P9 | ⬭ | e | e | e | e | e | e | e | e | PROGRAM | ❙ ❙ |
| P10 | ⬭ | c | c | c | c | c | c | c | c | RDS MODE | ◀◀ ▶▶ |
| P11 | ⬭ | SW | n | n | n | n | n | n | n | SIDE | ▼ ▲ |
| P12 | | LW | r | r | r | r | r | r | r | CLEAR | ❚❚ |
| P13 | ▶ | d | d | d | d | d | d | d | d | SET CLOCK | 📼 |
| P14 | ▶ | STEREO | - | - | 💿 | . Dp2 | Dp1 | AM | TIMER | DBB | ■ |
| P15 | ▶ | - | - | - | ((•)) | DDNR | col | PM | - | - | ▶ |
| P16 | S1 | - | - | - | - | - | - | - | - | S2 | S3 |

## FRONT BOARD PARTSLIST

### MISCELLANEOUS

| | | |
|---|---|---|
| 17 | 4822 256 10206 | Holder Led |
| 18 | 4822 466 10972 | Light Guide CDC |
| 1400 | 4822 135 00033 | Display Fluorescent |
| 1401 | 4822 267 51238 | Connector |
| 1411 | 4822 276 13114 | Tact switch |
| 1412 | 4822 276 13114 | Tact switch |
| 1413 | 4822 276 13114 | Tact switch |
| 1414 | 4822 276 13114 | Tact switch |
| 1415 | 4822 276 13114 | Tact switch |
| 1416 | 4822 276 13114 | Tact switch |
| 1417 | 4822 276 13114 | Tact switch |
| 1418 | 4822 276 13114 | Tact switch |
| 1419 | 4822 276 13114 | Tact switch |
| 1420 | 4822 276 13114 | Tact switch |
| 1421 | 4822 276 13114 | Tact switch |
| 1422 | 4822 276 13114 | Tact switch |
| 1423 | 4822 276 13114 | Tact switch |
| 1424 | 4822 276 13114 | Tact switch |
| 1425 | 4822 276 13114 | Tact switch |
| 1426 | 4822 276 13114 | Tact switch |
| 1427 | 4822 276 13114 | Tact switch |
| 1428 | 4822 276 13114 | Tact switch |
| 1429 | 4822 276 13114 | Tact switch |
| 1430 | 4822 276 13114 | Tact switch |
| 1431 | 4822 276 13114 | Tact switch |
| 1432 | 4822 276 13114 | Tact switch |
| 1433 | 4822 276 13114 | Tact switch |
| 1441 | 4822 276 13114 | Tact switch |
| 1442 | 4822 276 13114 | Tact switch (FW373C) |
| 1443 | 4822 276 13114 | Tact switch (FW373C) |
| 1444 | 4822 276 13114 | Tact switch (FW373C) |
| 1458 | 4822 101 90254 | Variable resistors |

### CAPACITORS

| | | |
|---|---|---|
| 2401 | 4822 124 41584 | 100µF 20% 10V |
| 2402 | 4822 124 41596 | 22µF 20% 50V |
| 2403 | 4822 124 41584 | 100µF 20% 10V |
| 2404 | 4822 126 11692 | 1µF |
| 2406 | 5322 122 32481 | 15PF 5% 50V |
| 2407 | 5322 122 32481 | 15PF 5% 50V |
| 2408 | 5322 122 32659 | 33PF 5% 50V |
| 2409 | 5322 122 32659 | 33PF 5% 50V |
| 2412 | 5322 122 32531 | 100PF 5% 50V |
| 2413 | 5322 122 32531 | 100PF 5% 50V |

### CAPACITORS

| | | |
|---|---|---|
| 2414 | 4822 122 33177 | 10nF 20% 50V |
| 2415 | 4822 126 12882 | 100nF+80-20% 50V |
| 2416 | 4822 122 33177 | 10nF 20% 50V |
| 2417 | 4822 122 33177 | 10nF 20% 50V |
| 2418 | 4822 126 13838 | 100nF 20% 50V |
| 2419 | 4822 126 13838 | 100nF 20% 50V |
| 2420 | 4822 122 33175 | 2.2nF 20% 50V |
| 2421 | 4822 126 13838 | 100nF 20% 50V |
| 2422 | 4822 126 11692 | 1µF 20% 16V |
| 2423 | 4822 122 33797 | 47nF 20% 50V |
| 2424 | 4822 126 13838 | 100nF 20% 50V |
| 2425 | 4822 124 40242 | 1µF 20% 63V |
| 2426 | 4822 124 40242 | 1µF 20% 63V |
| 2438 | 4822 126 12882 | 100nF+80-20% 50V |
| 2441 | 4822 124 41576 | 2.2µF 20% 50V |
| 2442 | 4822 122 33173 | 560PF 10% 50V(Not for -/21) |
| 2443 | 5322 122 32452 | 47PF 5% 63V(Not for -/21) |
| 2444 | 5322 122 32452 | 47PF 5% 63V(Not for -/21) |
| 2445 | 4822 126 13838 | 100nF 20% 50V(Not for -/21) |
| 2446 | 5322 122 32531 | 100PF 5% 50V |
| 2451 | 5322 122 32452 | 47PF 5% 63V |
| 2452 | 5322 122 32452 | 47PF 5% 63V |
| 2453 | 4822 122 33848 | 47PF 5% 50V |
| 2454 | 4822 122 33848 | 47PF 5% 50V |
| 2455 | 5322 122 32452 | 47PF 5% 63V |
| 2458 | 5322 122 32531 | 100PF 5% 50V |
| 2459 | 4822 126 12882 | 100NF+80-20% 50V (FW363) |

### RESISTORS

| | | |
|---|---|---|
| 3403 | 4822 116 52234 | 100K 5% 0.5W |
| 3404 | 4822 116 52234 | 100K 5% 0.5W |
| 3405 | 4822 051 10102 | 1k 2% 0.25W |
| 3406 | 4822 051 10102 | 1k 2% 0.25W |
| 3407 | 4822 051 10102 | 1k 2% 0.25W |
| 3408 | 4822 051 10102 | 1k 2% 0.25W |
| 3409 | 4822 051 10102 | 1k 2% 0.25W |
| 3410 | 4822 051 10102 | 1k 2% 0.25W |
| 3411 | 4822 051 10102 | 1k 2% 0.25W |
| 3412 | 4822 051 10102 | 1k 2% 0.25W |
| 3413 | 4822 051 10102 | 1k 2% 0.25W |
| 3414 | 4822 051 10102 | 1k 2% 0.25W |
| 3415 | 4822 051 10102 | 1k 2% 0.25W |
| 3416 | 4822 051 10102 | 1k 2% 0.25W |
| 3417 | 4822 051 10102 | 1k 2% 0.25W |

## FRONT BOARD PARTSLIST

### RESISTORS

| | | |
|---|---|---|
| 3418 | 4822 051 10102 | 1k 2% 0.25W |
| 3419 | 4822 051 10102 | 1k 2% 0.25W |
| 3420 | 4822 051 10102 | 1k 2% 0.25W |
| 3421 | 4822 051 10102 | 1k 2% 0.25W |
| 3422 | 4822 051 10102 | 1k 2% 0.25W |
| 3423 | 4822 051 10102 | 1k 2% 0.25W |
| 3424 | 4822 051 10102 | 1k 2% 0.25W |
| 3425 | 4822 051 10102 | 1k 2% 0.25W |
| 3426 | 4822 051 10102 | 1k 2% 0.25W |
| 3427 | 4822 051 10102 | 1k 2% 0.25W |
| 3428 | 4822 051 10102 | 1k 2% 0.25W |
| 3429 | 4822 051 10102 | 1k 2% 0.25W |
| 3430 | 4822 051 10102 | 1k 2% 0.25W |
| 3431 | 4822 051 10102 | 1k 2% 0.25W |
| 3432 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3433 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3434 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3435 | 4822 051 20103 | 10k 5% 0.1W |
| 3437 | 4822 116 52284 | 47K 5% 0.5W |
| 3438 | 4822 051 20103 | 10k 5% 0.1W |
| 3439 | 4822 051 20103 | 10k 5% 0.1W |
| 3440 | 4822 051 20474 | 470k 5% 0.1W |
| 3441 | 4822 051 20474 | 470k 5% 0.1W |
| 3442 | 4822 051 20103 | 10k 5% 0.1W |
| 3443 | 4822 051 20224 | 220k 5% 0.1W |
| 3444 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3445 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3446 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3447 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3448 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3449 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3450 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3451 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3452 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3453 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3454 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3455 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3456 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3457 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3458 | 4822 051 20331 | 330Ω 5% 0.1W |

### RESISTORS

| | | |
|---|---|---|
| 3459 | 4822 051 20103 | 10k 5% 0.1W |
| 3460 | 4822 051 20103 | 10k 5% 0.1W |
| 3461 | 4822 051 20103 | 10k 5% 0.1W |
| 3462 | 4822 051 20104 | 100k 5% 0.1W |
| 3463 | 4822 051 20105 | 1M 5% 0.1W |
| 3465 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3466 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3467 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3468 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3469 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3470 | 4822 051 20103 | 10k 5% 0.1W |
| 3471 | 4822 051 20332 | 3k3 5% 0.1W |
| 3472 | 4822 051 20103 | 10k 5% 0.1W |
| 3473 | 4822 051 10102 | 1k 2% 0.25W |
| 3475 | 4822 051 20103 | 10k 5% 0.1W |
| 3477 | 4822 051 10102 | 1k 2% 0.25W |
| 3478 | 4822 051 20684 | 680k 5% 0.1W |
| 3479 | 4822 116 52235 | 1M 5% 0.5W |
| 3480 | 4822 051 20473 | 47k 5% 0.1W |
| 3481 | 4822 051 10102 | 1k 2% 0.25W |
| 3482 | 4822 051 10102 | 1k 2% 0.25W |
| 3483 | 4822 051 10102 | 1k 2% 0.25W |
| 3484 | 4822 051 10102 | 1k 2% 0.25W |
| 3485 | 4822 051 10102 | 1k 2% 0.25W |
| 3486 | 4822 051 10102 | 1k 2% 0.25W |
| 3490 | 4822 051 10102 | 1k 2% 0.25W |
| 3491 | 4822 051 20104 | 100k 5% 0.1W |
| 3493 | 4822 051 20103 | 10k 5% 0.1W |
| 3494 | 4822 051 20103 | 10k 5% 0.1W |
| 3495 | 4822 117 11449 | 2K2 1% 0.1W |
| 3496 | 4822 051 10102 | 1k 2% 0.25W |
| 3497 | 4822 051 10102 | 1k 2% 0.25W |
| 3498 | 4822 051 10102 | 1k 2% 0.25W |
| 3499 | 4822 051 10102 | 1k 2% 0.25W |
| 3500 | 4822 051 10102 | 1k 2% 0.25W |
| 3501 | 4822 051 10102 | 1k 2% 0.25W |
| 3503 | 4822 051 10102 | 1k 2% 0.25W |
| 3505 | 4822 051 10102 | 1k 2% 0.25W |
| 3506 | 4822 051 10102 | 1k 2% 0.25W |
| 3507 | 4822 051 10102 | 1k 2% 0.25W |

## FRONT BOARD PARTSLIST

### RESISTORS

| | | |
|---|---|---|
| 3508 | 4822 051 10102 | 1k 2% 0.25W |
| 3509 | 4822 051 10102 | 1k 2% 0.25W |
| 3510 | 4822 051 10102 | 1k 2% 0.25W |
| 3512 | 4822 051 10102 | 1k 2% 0.25W |
| 3513 | 4822 116 83864 | 10k 5% 0.5W |
| 3514 | 4822 051 10102 | 1k 2% 0.25W |
| 3515 | 4822 051 20103 | 10k 5% 0.1W |
| 3516 | 4822 051 10102 | 1k 2% 0.25W |
| 3517 | 4822 051 20103 | 10k 5% 0.1W |
| 3518 | 4822 051 10102 | 1k 2% 0.25W |
| 3519 | 4822 051 20103 | 10k 5% 0.1W |
| 3520 | 4822 051 10102 | 1k 2% 0.25W |
| 3521 | 4822 051 20103 | 10k 5% 0.1W |
| 3525 | 4822 051 10102 | 1k 2% 0.25W |
| 3527 | 4822 116 52245 | 150K 5% 0.5W |
| 3528 | 4822 051 20103 | 10k 5% 0.1W |
| 3529 | 4822 051 20103 | 10k 5% 0.1W |
| 3530 | 4822 051 20479 | 47Ω 5% 0.1W |
| 3531 | 4822 051 20103 | 10k 5% 0.1W |
| 3532 | 4822 051 20103 | 10k 5% 0.1W |
| 3533 | 4822 051 10102 | 1k 2% 0.25W |
| 3534 | 4822 051 10102 | 1k 2% 0.25W |
| 3536 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3537 | 4822 051 10102 | 1k 2% 0.25W |
| 3538 | 4822 051 20103 | 10k 5% 0.1W |
| 3540 | 4822 051 20103 | 10k 5% 0.1W (For -/21 & -/37) |
| 3541 | 4822 051 10102 | 1k 2% 0.25W (For -/21 & -/37) |
| 3542 | 4822 116 83864 | 10k 5% 0.5W (For -/22 & -/25) |
| 3543 | 4822 117 11449 | 2k2 1% 0.1W (For -/22 & -/25) |
| 3544 | 4822 051 20224 | 220k 5% 0.1W (For -/22 & -/25) |
| 3545 | 4822 116 83864 | 10K 5% 0.5W (For -/22 & -/25) |
| 3551 | 4822 051 10102 | 1k 2% 0.25W |
| 3552 | 4822 051 10102 | 1k 2% 0.25W |
| 3553 | 4822 051 10102 | 1k 2% 0.25W |
| 3554 | 4822 051 10102 | 1k 2% 0.25W |
| 3555 | 4822 051 10102 | 1k 2% 0.25W |
| 3556 | 4822 051 20103 | 10k 5% 0.1W |
| 3557 | 4822 051 20103 | 10k 5% 0.1W |
| 3558 | 4822 051 20103 | 10k 5% 0.1W |
| 3571 | 4822 051 20331 | 330Ω 5% 0.1W (FW373C) |

### RESISTORS

| | | |
|---|---|---|
| 3572 | 4822 051 20331 | 330Ω 5% 0.1W (FW373C) |
| 3573 | 4822 051 20331 | 330Ω 5% 0.1W (FW373C) |
| 3574 | 4822 051 20103 | 10k 5% 0.1W |
| 3580 | 4822 116 52276 | 3K9 5% 0.5W |
| 3581 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3582 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3583 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3584 | 4822 051 20331 | 330Ω 5% 0.1W |
| 3591 | 4822 052 10108 | 1Ω 5% 0.33W |
| 3592 | 4822 052 10108 | 1Ω 5% 0.33W |
| 3593 | 4822 051 20103 | 10k 5% 0.1W |
| 3594 | 4822 116 83864 | 10K 5% 0.5W |
| 3595 | 4822 116 83864 | 10K 5% 0.5W |

### CHIP JUMPER

| | | |
|---|---|---|
| 4421 | 4822 051 20008 | 0Ω Jumper |
| 4422 | 4822 051 20008 | 0Ω Jumper |
| 4423 | 4822 051 20008 | 0Ω Jumper |
| 4424 | 4822 051 20008 | 0Ω Jumper |
| 4425 | 4822 051 20008 | 0Ω Jumper |
| 4426 | 4822 051 20008 | 0Ω Jumper |
| 4427 | 4822 051 20008 | 0Ω Jumper |
| 4430 | 4822 051 20008 | 0Ω Jumper |
| 4431 | 4822 051 20008 | 0Ω Jumper |
| 4432 | 4822 051 20008 | 0Ω Jumper |
| 4483 | 4822 051 20008 | 0Ω Jumper |
| 4485 | 4822 051 20008 | 0Ω Jumper |
| 4486 | 4822 051 20008 | 0Ω Jumper |
| 4487 | 4822 051 20008 | 0Ω Jumper |
| 4488 | 4822 051 20008 | 0Ω Jumper |

### COIL & CRYSTAL

| | | |
|---|---|---|
| 5402 | 4822 242 70938 | Crystal (32.768KHZ) |
| 5403 | 4822 242 72195 | Crystal 8MHz(Not for -/21) |
| 5406 | 4822 156 21721 | Coil 2.2μH 10% |
| 5407 | 4822 156 21721 | Coil 2.2μH 10%(Not for -/21) |
| 5410 | 5322 242 73697 | Filter 8MHz |

### DIODE

| | | |
|---|---|---|
| 6401 | 4822 130 30621 | 1N4148 |
| 6402 | 4822 130 30621 | 1N4148 |
| 6412 | 4822 130 30621 | 1N4148 |
| 6413 | 4822 130 30621 | 1N4148 |
| 6414 | 4822 130 30621 | 1N4148 |

## FRONT BOARD PARTSLIST

### DIODE

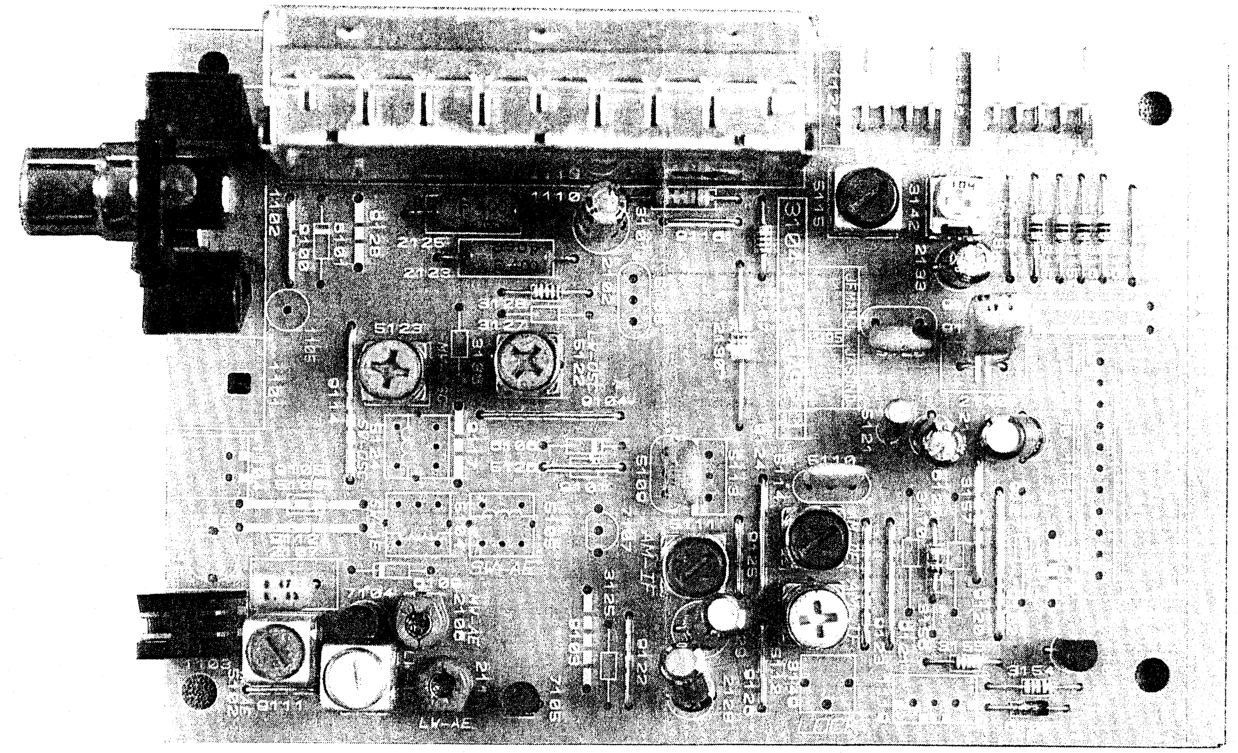
| | | |
|---|---|---|
| 6415 | 4822 130 30621 | 1N4148 |
| 6416 | 4822 130 30621 | 1N4148 |
| 6417 | 4822 130 82978 | LTL-16KGE |
| 6418 | 4822 130 82978 | LTL-16KGE |
| 6419 | 4822 130 82978 | LTL-16KGE |
| 6420 | 4822 130 82978 | LTL-16KGE |
| 6421 | 4822 130 82978 | LTL-16KGE (FW373C) |
| 6422 | 4822 130 82978 | LTL-16KGE (FW373C) |
| 6423 | 4822 130 82978 | LTL-16KGE (FW373C) |
| 6425 | 4822 130 82978 | LTL-16KGE |
| 6445 | 4822 130 30621 | 1N4148 |
| 6446 | 4822 130 30621 | 1N4148 |
| 6447 | 4822 130 30621 | 1N4148 |
| 6448 | 4822 130 30621 | 1N4148 |
| 6449 | 4822 130 30621 | 1N4148 |
| 6450 | 4822 130 30621 | 1N4148 |
| 6451 | 4822 130 30621 | 1N4148 |
| 6452 | 4822 130 30621 | 1N4148 |
| 6453 | 4822 130 30621 | 1N4148 |
| 6454 | 4822 130 30621 | 1N4148 |
| 6455 | 4822 130 30621 | 1N4148 |
| 6456 | 4822 130 30621 | 1N4148 |
| 6457 | 4822 130 30621 | 1N4148 |
| 6458 | 4822 130 30621 | 1N4148 |

### INTERGRATED CIRCUIT

| | | |
|---|---|---|
| 7401 | 4822 209 15441 | TMP87CS71F-373S51391 (FW373C) |
| 7401 | 4822 209 15442 | TMP87CS71F-363S51381 (FW363) |
| 7403 | 4822 209 31508 | ST24C01B1 |
| 7404 | 4822 209 31981 | SAA6579T/V1 |
| 7416 | 5322 209 12171 | 74HC4094D |
| 5404 | 9350 400 70118 | IC SAA6579T/VI (Not for -/21) |

### TRANSISTOR

| | | |
|---|---|---|
| 7406 | 5322 130 42755 | BC847C |
| 7407 | 5322 130 42755 | BC847C |
| 7414 | 5322 130 42755 | BC847C |
| 7415 | 5322 130 42755 | BC847C |
| 7417 | 5322 130 42755 | BC847C |
| 7420 | 5322 130 42755 | BC847C |
| 7428 | 4822 130 10165 | GP1U28XP |



# TUNER 95 BOARD

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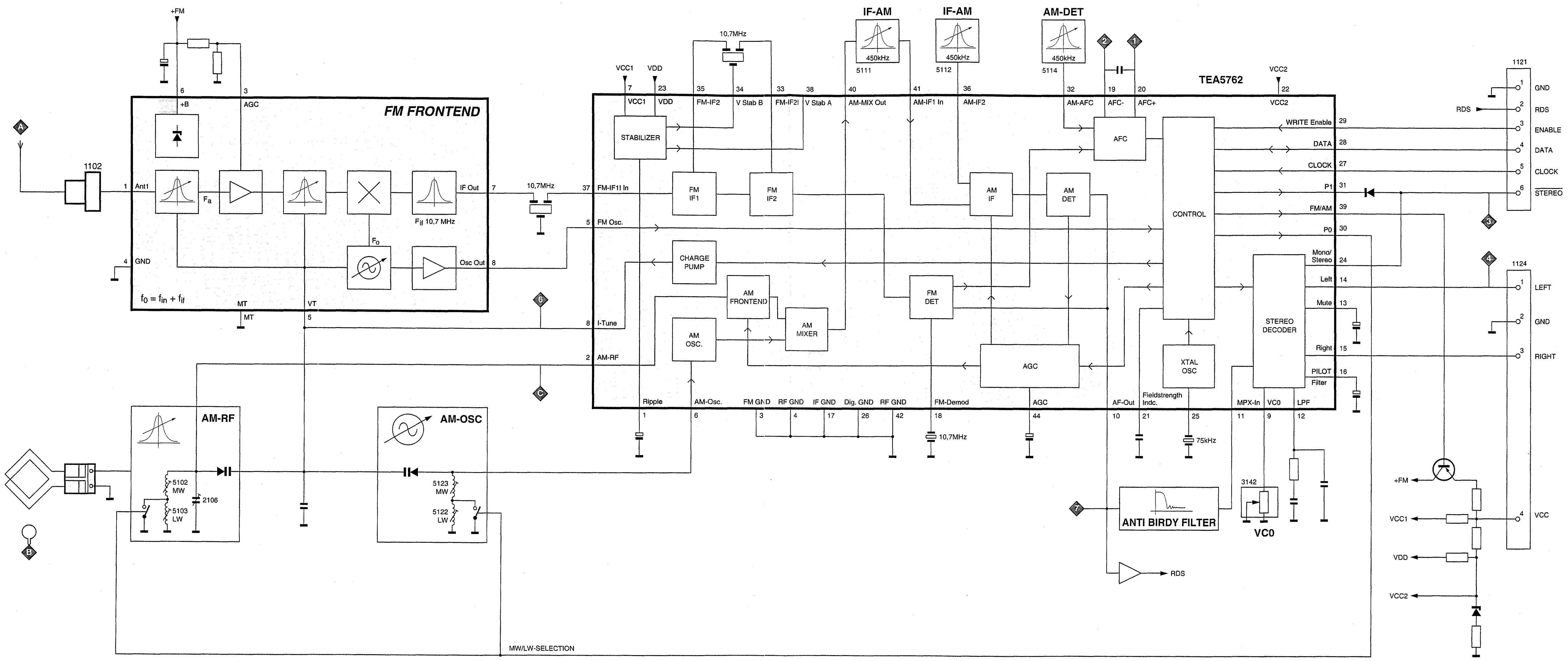
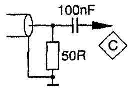
## BLOCKDIAGRAM


+FM
6
+B
3
AGC
FM FRONTEND
A
1102
1
Ant1
Fa
IF Out
7
Fif 10,7 MHz
Fo
4
GND
Osc Out
8
f0 = fin + fif
MT
VT
MT
5
10,7MHz
10,7MHz
VCC1
VDD
7
23
35
34
33
38
40
41
36
32
19
20
VCC1
VDD
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
IF-AM
450kHz
5111
IF-AM
450kHz
5112
AM-DET
450kHz
5114
2
1
VCC2
22
VCC2
TEA5762
STABILIZER
37
FM-IF1 In
FM IF1
FM IF2
AM IF
AM DET
AFC
CONTROL
5
FM Osc.
CHARGE PUMP
AM FRONTEND
AM MIXER
FM DET
6
8
I-Tune
AM OSC.
2
AM-RF
AGC
XTAL OSC
STEREO DECODER
C
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VC0
LPF
1
6
3
4
17
26
42
18
44
10
21
25
11
9
12
10,7MHz
75kHz
WRITE Enable
29
DATA
28
CLOCK
27
P1
31
FM/AM
39
P0
30
Mono/ Stereo
24
Left
14
Mute
13
Right
15
PILOT Filter
16
1121
1
GND
RDS
2
RDS
3
ENABLE
4
DATA
5
CLOCK
6
STEREO
3
4
1124
1
LEFT
2
GND
3
RIGHT
AM-RF
5102 MW
5103 LW
2106
B
AM-OSC
5123 MW
5122 LW
7
ANTI BIRDY FILTER
3142
VC0
RDS
+FM
VCC1
4
VCC
VDD
VCC2
MW/LW-SELECTION

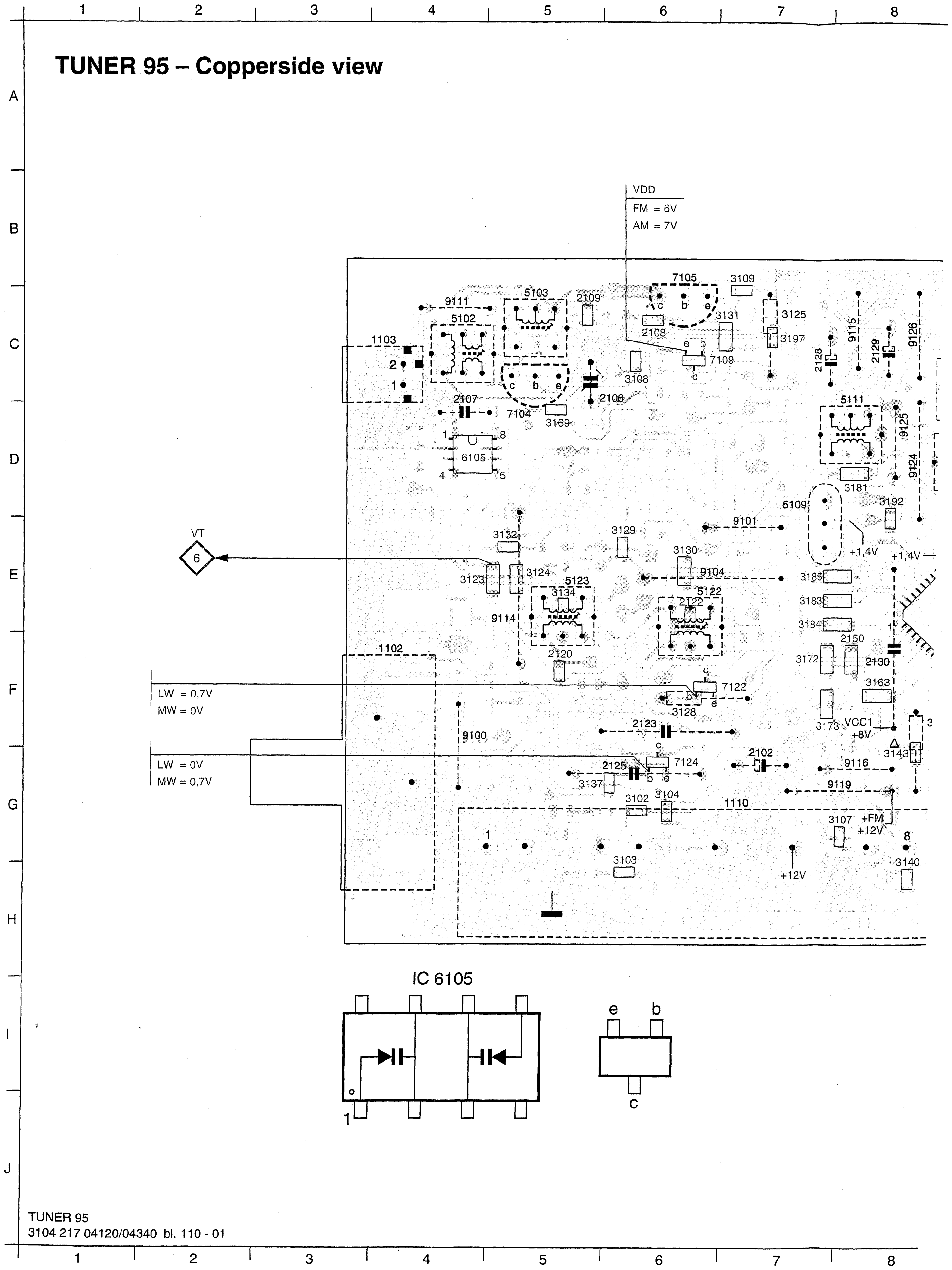
## ADJUSTMENT TABLE

| Waverange | Input frequency | Input | Tuned to | Adjust | Output | Scope/Voltmeter |
|---|---|---|---|---|---|---|
| *VARICAP ALIGNMENT* | | | | | | |
| **FM**<br>87.5 - 108MHz<br>(50kHz grid) | | | 108MHz | check | 6 | 7...9V |
| | | | 87.5MHz | check | | 1.3...2V |
| **MW**<br>531 - 1602kHz<br>(9kHz grid) | | | 1602kHz | 5123 | | 8.3V ±0.2V |
| | | | 531kHz | check | | 1V ±0.4V |
| **LW**<br>153 - 279kHz<br>(3kHz grid) | | | 279kHz | 5122 | | 8.3V ±0.2V |
| | | | 153kHz | check | | 1V ±0.4V |
| *FM - VCO* | | | | | | |
| **FM** | 98MHz 1mV<br>continuous wave | A | 98MHz | 3142 | 3 | 152kHz ±1kHz |
| *DISTORTION* | | | | | | |
| **FM** | 98MHz 1mV<br>90% L, 9% pilot<br>mod=1kHz | A | 98MHz | mixcoil<br>inside tuner<br>1110 | 4 | min. distortion |
| *AM IF* | | | | | | |
| **MW** | 450kHz<br>Δf=10kHz<br>as low as possible |  | | 5111 | 7 | symmetrical and<br>max. height ↕ |
| | | | | 5112 | | |
| | 450.0kHz<br>continuous wave | C | | 5114 | 1<br>2 | 0mV ±2mV |
| *AM RF* | | | | | | |
| **MW** | 588kHz<br>mod=1kHz, 30% AM<br>1494kHz | B* | 558kHz | 5102 | 7 | MAX ↕ |
| | | | 1494kHz | 2106 | | |
| **LW** | 198kHz<br>mod=1kHz, 30% AM | | 198kHz | 5103 | | MAX |

* Signal supplied via frame antenna

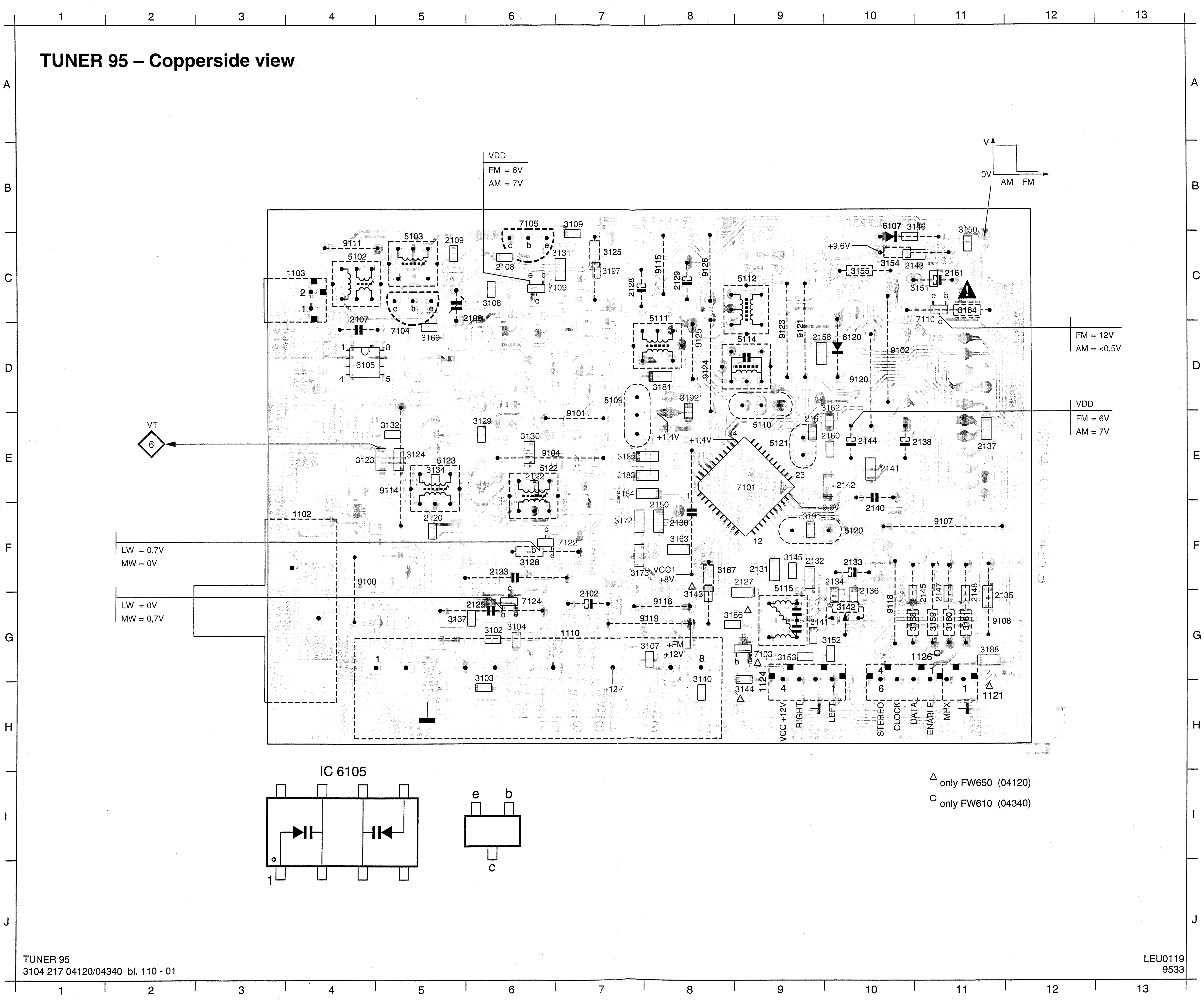
↕ Repeat

## TUNER 95 – Copperside view


1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
H
I
J
VDD
FM = 6V
AM = 7V
VT
6
LW = 0,7V
MW = 0V
LW = 0V
MW = 0,7V
1103
1102
1110
9100
9111
5102
5103
2109
7105
3109
3131
2108
7109
3125
3197
3108
2128
9115
2129
9126
2107
7104
3169
2106
5111
9125
9124
6105
3181
3192
5109
9101
+1,4V
3132
3129
3130
3123
3124
5123
3134
9104
5122
2122
3185
3183
3184
9114
2120
2150
3172
2130
3163
7122
3128
2123
3173
VCC1
+8V
3143
2102
2125
7124
9116
3137
3102
3104
9119
3107
+FM
+12V
3103
3140
IC 6105
e
b
c
1

TUNER 95
3104 217 04120/04340 bl. 110 - 01

## TUNER 95 – Copperside view


VDD
FM = 6V
AM = 7V
V
0V
AM FM
FM = 12V
AM = <0,5V
VDD
FM = 6V
AM = 7V
VT
6
LW = 0,7V
MW = 0V
LW = 0V
MW = 0,7V
+9,6V
+1,4V
VCC1 +8V
+FM +12V
+12V
VCC +12V
RIGHT
LEFT
STEREO
CLOCK
DATA
ENABLE
MPX
7101
IC 6105
e b c

△ only FW650 (04120)

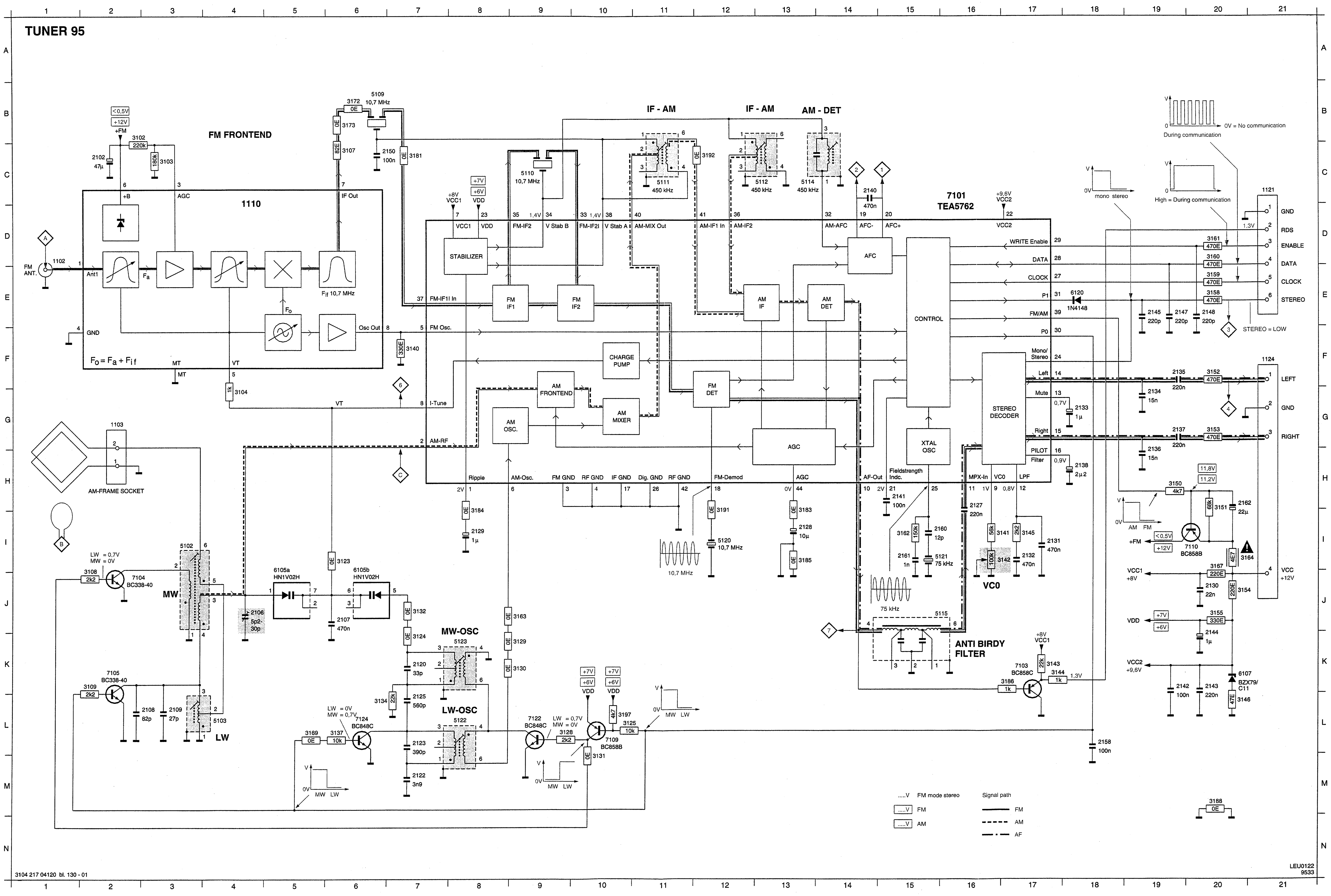
○ only FW610 (04340)

TUNER 95
3104 217 04120/04340 bl. 110 - 01

LEU0119
9533

| | | | | | |
|---|---|---|---|---|---|
| 1102 | F4 | 3108 | C6 | 3181 | D8 |
| 1103 | C3 | 3109 | B7 | 3183 | E7 |
| 1110 | G7 | 3123 | E4 | 3184 | E7 |
| 1121 | H11 | 3124 | E5 | 3185 | E7 |
| 1124 | H9 | 3125 | C7 | 3186 | G8 |
| 1126 | G10 | 3128 | F6 | 3188 | G11 |
| 2102 | G7 | 3129 | E6 | 3191 | F9 |
| 2106 | C5 | 3130 | E6 | 3192 | D8 |
| 2107 | D4 | 3131 | C6 | 3197 | C7 |
| 2108 | C6 | 3132 | E5 | 5102 | C4 |
| 2109 | C5 | 3134 | E5 | 5103 | C5 |
| 2120 | F5 | 3137 | G5 | 5109 | D7 |
| 2122 | E6 | 3140 | H8 | 5110 | E9 |
| 2123 | F6 | 3141 | G9 | 5111 | C8 |
| 2125 | G5 | 3142 | G10 | 5112 | C9 |
| 2127 | F8 | 3143 | G8 | 5114 | D9 |
| 2128 | C7 | 3144 | H8 | 5115 | G9 |
| 2129 | C8 | 3145 | F9 | 5120 | F10 |
| 2130 | F8 | 3146 | B10 | 5121 | E9 |
| 2131 | F9 | 3150 | C11 | 5122 | E6 |
| 2132 | F9 | 3151 | C10 | 5123 | E5 |
| 2133 | F10 | 3152 | G9 | 6105 | D4 |
| 2134 | F9 | 3153 | G9 | 6107 | B10 |
| 2135 | G11 | 3154 | C10 | 6120 | D10 |
| 2136 | G10 | 3155 | C10 | 7101 | E9 |
| 2137 | E11 | 3158 | G10 | 7103 | G9 |
| 2138 | E10 | 3159 | G11 | 7104 | D5 |
| 2140 | F10 | 3160 | G11 | 7105 | B6 |
| 2141 | E10 | 3161 | G11 | 7109 | C6 |
| 2142 | E10 | 3162 | E9 | 7110 | D11 |
| 2143 | C10 | 3163 | F8 | 7122 | F7 |
| 2144 | E10 | 3164 | C11 | 7124 | G6 |
| 2145 | G11 | 3167 | F8 | 9100 | F4 |
| 2147 | G11 | 3169 | D5 | 9101 | E7 |
| 2148 | G11 | 3172 | F7 | 9102 | D10 |
| 2150 | F8 | 3173 | F7 | 9104 | E6 |
| 2158 | D9 | | | 9107 | F11 |
| 2160 | E9 | | | 9108 | G11 |
| 2161 | E9 | | | 9111 | C4 |
| 2161 | C11 | | | 9114 | E5 |
| 3102 | G6 | | | 9115 | C8 |
| 3103 | H6 | | | 9116 | G8 |
| 3104 | G6 | | | 9118 | G10 |
| 3107 | G7 | | | 9119 | G7 |
| | | | | 9120 | D10 |
| | | | | 9121 | D9 |
| | | | | 9123 | D9 |
| | | | | 9124 | D8 |
| | | | | 9125 | D8 |
| | | | | 9126 | C8 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1102 | D1 | 1124 | F21 | 2108 | L3 | 2123 | L7 | 2129 | I8 | 2133 | G18 | 2137 | G19 | 2142 | K19 | 2147 | E19 | 2160 | I15 | 3103 | C3 | 3109 | K2 | 3128 | L9 | 3132 | J7 | 3141 | I16 | 3145 | I17 | 3152 | F20 | 3158 | E20 | 3162 | I15 | 3169 | L5 | 3183 | I13 | 3188 | M20 | 5102 | I3 | 5111 | C11 | 5120 | I12 | 6105a | I5 | 7101 | C16 | 7109 | L10 |
| 1103 | G2 | 2102 | C2 | 2109 | L3 | 2125 | L7 | 2130 | J20 | 2134 | G19 | 2138 | H18 | 2143 | K20 | 2148 | E20 | 2161 | I15 | 3104 | G4 | 3123 | I6 | 3129 | K9 | 3134 | L6 | 3142 | I16 | 3146 | L20 | 3153 | G20 | 3159 | E20 | 3163 | J9 | 3172 | B6 | 3184 | I8 | 3191 | I12 | 5103 | L4 | 5112 | C12 | 5121 | I15 | 6105b | I6 | 7103 | K17 | 7110 | I19 |
| 1110 | D4 | 2106 | J4 | 2120 | K7 | 2127 | H16 | 2131 | I17 | 2135 | F19 | 2140 | C14 | 2144 | K20 | 2150 | C6 | 2162 | H20 | 3107 | C6 | 3124 | K7 | 3130 | K9 | 3137 | L6 | 3143 | K17 | 3150 | H19 | 3154 | J20 | 3160 | D20 | 3164 | I20 | 3173 | B6 | 3185 | I13 | 3192 | C12 | 5109 | B6 | 5114 | C13 | 5122 | L8 | 6107 | K20 | 7104 | J2 | 7122 | L9 |
| 1121 | C21 | 2107 | J6 | 2122 | M7 | 2128 | I13 | 2132 | I17 | 2136 | H19 | 2141 | H15 | 2145 | E19 | 2158 | L18 | 3102 | B2 | 3108 | J2 | 3125 | L10 | 3131 | M10 | 3140 | F7 | 3144 | K17 | 3151 | I20 | 3155 | J20 | 3161 | D20 | 3167 | I20 | 3181 | C7 | 3186 | K16 | 3197 | L10 | 5110 | C9 | 5115 | J15 | 5123 | K8 | 6120 | E18 | 7105 | K2 | 7124 | L6 |


TUNER 95
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
A B C D E F G H I J K L M N
FM FRONTEND
1110
FM ANT.
1102
Ant1
GND
Fa
Fo
Fif 10,7 MHz
IF Out
Osc Out
AGC
+B
MT
VT
Fo = Fa + Fif
<0,5V
+12V
+FM
3102 220k
2102 47µ
3103 180k
3104 1k
5109 10,7 MHz
3172 0E
3173 0E
3107 82E
2150 100n
3181 0E
3140 330E
IF - AM
IF - AM
AM - DET
5110 10,7 MHz
5111 450 kHz
5112 450 kHz
5114 450 kHz
3192 0E
2140 470n
7101
TEA5762
+8V VCC1
+7V +6V VDD
+9,6V VCC2
VCC1
VDD
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
STABILIZER
FM IF1
FM IF2
AM IF
AM DET
AFC
CONTROL
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
FM DET
AGC
XTAL OSC
STEREO DECODER
FM-IF1 In
FM Osc.
I-Tune
AM-RF
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VCO
LPF
WRITE Enable
DATA
CLOCK
P1
FM/AM
P0
Mono/Stereo
Left
Mute
Right
PILOT
Filter
6120 1N4148
2145 220p
2147 220p
2148 220p
3161 470E
3160 470E
3159 470E
3158 470E
1121
GND
RDS
ENABLE
DATA
CLOCK
STEREO
STEREO = LOW
1,3V
0V = No communication
During communication
High = During communication
mono stereo
1124
LEFT
GND
RIGHT
2135 220n
3152 470E
2137 220n
3153 470E
2134 15n
2136 15n
2133 1µ
2138 2µ2
0,7V
0,9V
3184 0E
2129 1µ
3191 0E
5120 10,7 MHz
10,7 MHz
3183 0E
2128 10µ
3185 0E
2141 100n
3162 150k
2160 12p
2161 1n
5121 75 kHz
75 kHz
2127 220n
3141 56k
3142 100k
3145 2k2
2132 470n
2131 470n
VCO
5115
ANTI BIRDY FILTER
1103
AM-FRAME SOCKET
5102
MW
LW = 0,7V
MW = 0V
3108 2k2
7104 BC338-40
7105 BC338-40
3109 2k2
2108 82p
2109 27p
5103
LW
2106 5p2-30p
6105a HN1V02H
6105b HN1V02H
3123 0E
2107 470n
3132 0E
3124 0E
MW-OSC
5123
2120 33p
3134 22k
2125 560p
LW-OSC
5122
2123 390p
2122 3n9
3163 0E
3129 0E
3130 0E
LW = 0V
MW = 0,7V
7124 BC848C
3169 0E
3137 10k
MW LW
7122 BC848C
LW = 0,7V
MW = 0V
3128 2k2
3131 0E
7109 BC858B
3197 4k7
3125 10k
+7V +6V VDD
+8V VCC1
7103 BC858C
3143 22k
3144 1k
3186 1k
1,3V
2158 100n
11,8V
11,2V
3150 4k7
3151 68k
2162 22µ
7110 BC858B
+FM
<0,5V
+12V
AM FM
3164 4E7
VCC1 +8V
3167 220E
2130 22n
3154 220E
VCC +12V
VDD
+7V +6V
3155 330E
2144 1µ
VCC2 +9,6V
2142 100n
2143 220n
6107 BZX79/C11
3146 47E
.....V FM mode stereo
.....V FM
.....V AM
Signal path
FM
AM
AF
3188 0E
3104 217 04120 bl. 130 - 01
LEU0122 9533

## *ELECTRICAL PARTSLIST TUNER 95 BOARD*

### MISCELLANEOUS

| | | |
|---|---|---|
| 1102 | 4822 267 10283 | SOCKET COAX IEC 75R |
| 1103 | 4822 265 31184 | JST CONNECTOR 2 POLE |
| 1110 | 4822 210 10492 | FRONTEND ASSY /02/08 |

### DIODES

| | | |
|---|---|---|
| 6105 | 4822 130 83075 | HN1V02H |
| 6107 | 4822 130 34488 | BZX79-C11 |
| 6120 | 4822 130 30621 | 1N4148 |

### TRANSISTORS

| | | |
|---|---|---|
| 7103 | 4822 130 42513 | BC858C |
| 7104 | 5322 130 44779 | BC338-40 |
| 7105 | 5322 130 44779 | BC338-40 |
| 7109 | 5322 130 41983 | BC858B |
| 7110 | 5322 130 41983 | BC858B |
| 7122 | 5322 130 42136 | BC848C |
| 7124 | 5322 130 42136 | BC848C |

### INTEGRATED CIRCUITS

| | | |
|---|---|---|
| 7101 | 4822 209 90315 | TEA5762H/V1 |

### COILS

| | | |
|---|---|---|
| 5102 | 4822 157 71634 | RF-COIL MW |
| 5103 | 4822 157 71635 | RF-COIL LW |
| 5109 | 4822 157 71639 | CER. FILTER 10,7MHz |
| 5110 | 4822 242 70665 | CER. FILTER 10,7MHZ |
| 5111 | 4822 158 60511 | AM-IF FILTER 450kHz |
| 5112 | 4822 157 70302 | AM-IF FILTER 450kHz |
| 5114 | 4822 157 71637 | AM-AFC FILTER 450KHZ |
| 5115 | 4822 157 71636 | ANTI-BIRDY FILTER |
| 5120 | 4822 242 82065 | CER. DISCRIMINATOR |
| 5121 | 4822 242 81021 | QUARTZ 75kHz |
| 5122 | 4822 157 60517 | RF-COIL AM |
| 5123 | 4822 157 60517 | RF-COIL AM |

### RESISTORS

| | | | | |
|---|---|---|---|---|
| 3125 | 4822 116 83864 | 10k | 5% | 0,5W |
| 3128 | 4822 116 52256 | 2k2 | 5% | 0,16W |
| 3142 | 4822 100 11163 | TRIMPOT. 100K LIN. | | |
| 3154 | 4822 116 52215 | 220R | 5% | 0,16W |
| 3155 | 4822 116 52219 | 330R | 5% | 0,5W |
| 3158 | 4822 116 52224 | 470R | 5% | 0,5W |
| 3159 | 4822 116 52224 | 470R | 5% | 0,5W |
| 3160 | 4822 116 52224 | 470R | 5% | 0,5W |
| 3161 | 4822 116 52224 | 470R | 5% | 0,5W |
| 3164 | 4822 052 10478 | 4R7 | 5% | NFR |
| 3167 | 4822 116 52215 | 220R | 5% | 0,16W |

### CHIP RESISTORS

| | | | | |
|---|---|---|---|---|
| 3102 | 4822 051 20224 | 220k | 5% | 0,1W |
| 3103 | 4822 051 20184 | 180k | 5% | 0,1W |
| 3104 | 4822 051 10102 | 1k | 2% | 0,25W |
| 3107 | 4822 051 20829 | 82R | 5% | 0,1W |
| 3108 | 4822 051 20222 | 2k2 | 5% | 0,1W |
| 3109 | 4822 051 20222 | 2k2 | 5% | 0,1W |
| 3123 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3124 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3129 | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 3130 | 4822 051 10008 | CHIP JUMPER 1206 | | |

### CHIP RESISTORS

| | | | | |
|---|---|---|---|---|
| 3131 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3132 | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 3134 | 4822 051 20223 | 22k | 5% | 0,1W |
| 3137 | 4822 051 20103 | 10k | 5% | 0,1W |
| 3140 | 4822 051 20331 | 330R | 5% | 0,1W |
| 3141 | 4822 051 20563 | 56k | 5% | 0,1W |
| 3143 | 4822 051 20223 | 22k | 5% | 0,1W |
| 3144 | 4822 051 10102 | 1k | 2% | 0,25W |
| 3145 | 4822 051 20222 | 2k2 | 5% | 0,1W |
| 3146 | 4822 051 20479 | 47R | 5% | 0,1W |
| 3150 | 4822 051 20472 | 4k7 | 5% | 0,1W |
| 3151 | 4822 051 20683 | 68k | 5% | 0,1W |
| 3152 | 4822 051 20471 | 470R | 5% | 0,1W |
| 3153 | 4822 051 20471 | 470R | 5% | 0,1W |
| 3162 | 4822 051 20154 | 150k | 5% | 0,1W |
| 3163 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3169 | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 3172 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3173 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3181 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3183 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3184 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3185 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3186 | 4822 051 10102 | 1k | 2% | 0,25W |
| 3188 | 4822 051 10008 | CHIP JUMPER 1206 | | |
| 3191 | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 3192 | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 3197 | 4822 051 20472 | 4k7 | 5% | 0,1W |

### CAPACITORS

| | | | | |
|---|---|---|---|---|
| 2102 | 4822 124 40433 | 47µF | 20% | 25V |
| 2106 | 4822 125 60102 | 30pF | | VARIABLE |
| 2107 | 4822 121 51252 | 470nF | 5% | 63V |
| 2123 | 4822 121 51254 | 390pF | 1% | 400V |
| 2125 | 4822 121 51381 | 560pF | 1% | 400V |
| 2128 | 4822 124 41579 | 10µF | 20% | 50V |
| 2129 | 4822 124 40242 | 1µF | 20% | 63V |
| 2130 | 4822 126 11585 | 22nF | 20% | 50V |
| 2133 | 4822 124 40242 | 1µF | 20% | 63V |
| 2138 | 4822 124 41576 | 2,2µF | 20% | 50V |
| 2140 | 4822 121 51252 | 470nF | 5% | 63V |
| 2144 | 4822 124 40242 | 1µF | 20% | 63V |
| 2162 | 4822 124 41596 | 22µF | 20% | 50V |

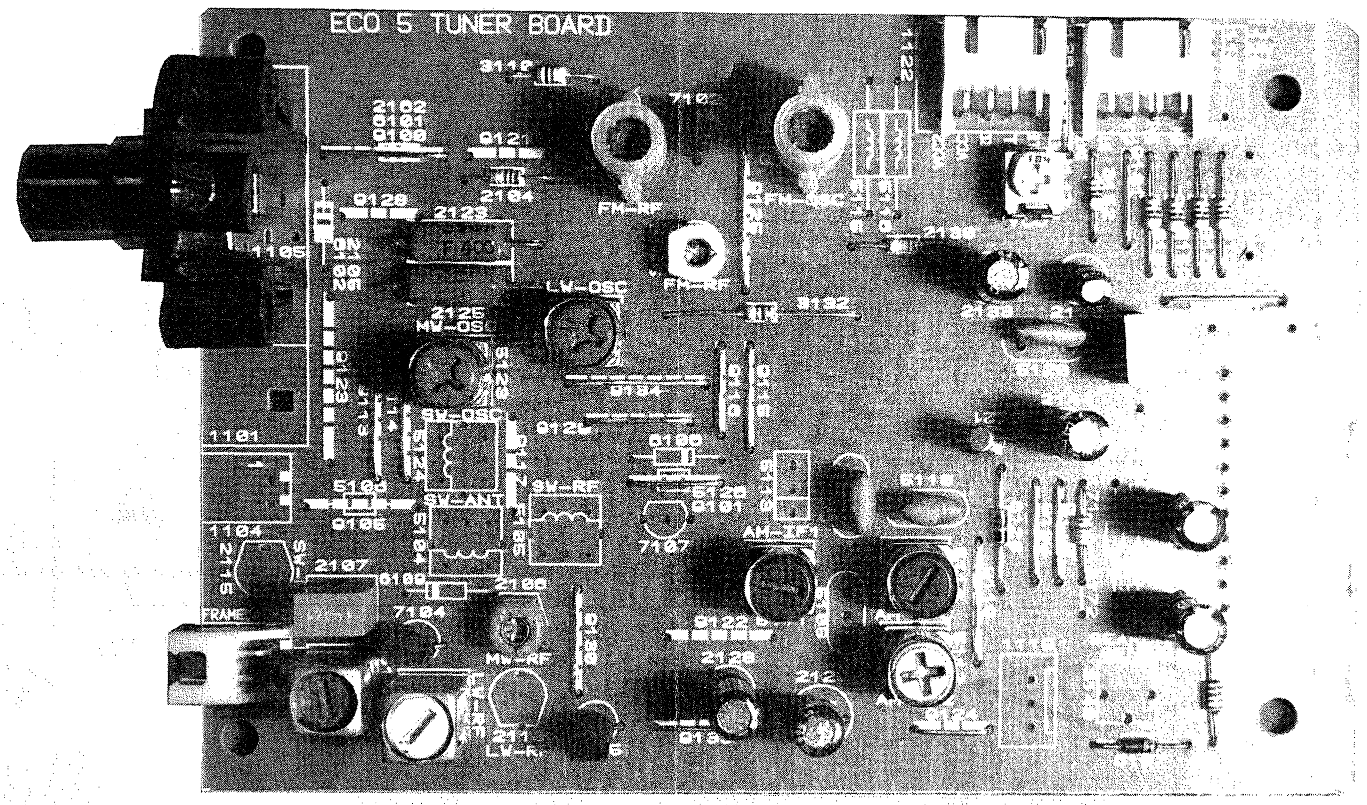
### CHIP CAPACITORS

| | | | | |
|---|---|---|---|---|
| 2108 | 4822 122 33515 | 82pF | 5% | 50V |
| 2109 | 5322 122 31946 | 27pF | 5% | 50V |
| 2120 | 5322 122 32659 | 33pF | 5% | 50V |
| 2122 | 5322 126 10465 | 3,9nF | 10% | 63V |
| 2127 | 4822 122 32927 | 220nF | 10% | 63V |
| 2131 | 4822 122 33325 | 470nF | 20% | 50V |
| 2132 | 4822 122 33325 | 470nF | 20% | 50V |
| 2134 | 4822 122 33128 | 15nF | 10% | 63V |
| 2135 | 4822 122 32927 | 220nF | 10% | 63V |
| 2136 | 4822 122 33128 | 15nF | 10% | 63V |
| 2137 | 4822 122 32927 | 220nF | 10% | 63V |
| 2141 | 4822 122 31947 | 100nF | 20% | 50V |
| 2142 | 4822 122 31947 | 100nF | 20% | 50V |
| 2143 | 4822 122 32927 | 220nF | 10% | 63V |
| 2145 | 4822 122 33575 | 220pF | 5% | 50V |
| 2147 | 4822 122 33575 | 220pF | 5% | 50V |

## *ELECTRICAL PARTSLIST TUNER 95 BOARD*

### CHIP CAPACITORS

| | | | | |
|---|---|---|---|---|
| 2148 | 4822 122 33575 | 220pF | 5% | 50V |
| 2150 | 4822 122 31947 | 100nF | 20% | 50V |
| 2158 | 4822 122 31947 | 100nF | 20% | 50V |
| 2160 | 4822 122 32139 | 12pF | 5% | 63V |
| 2161 | 5322 122 34123 | 1nF | 10% | 50V |


ECO 5 TUNER BOARD
FM-RF
FM-OSC
LW-OSC
MW-OSC
SW-OSC
SW-ANT
SW-RF
MW-RF
AM-IF1
FRAME

# TUNER BOARD ECO5

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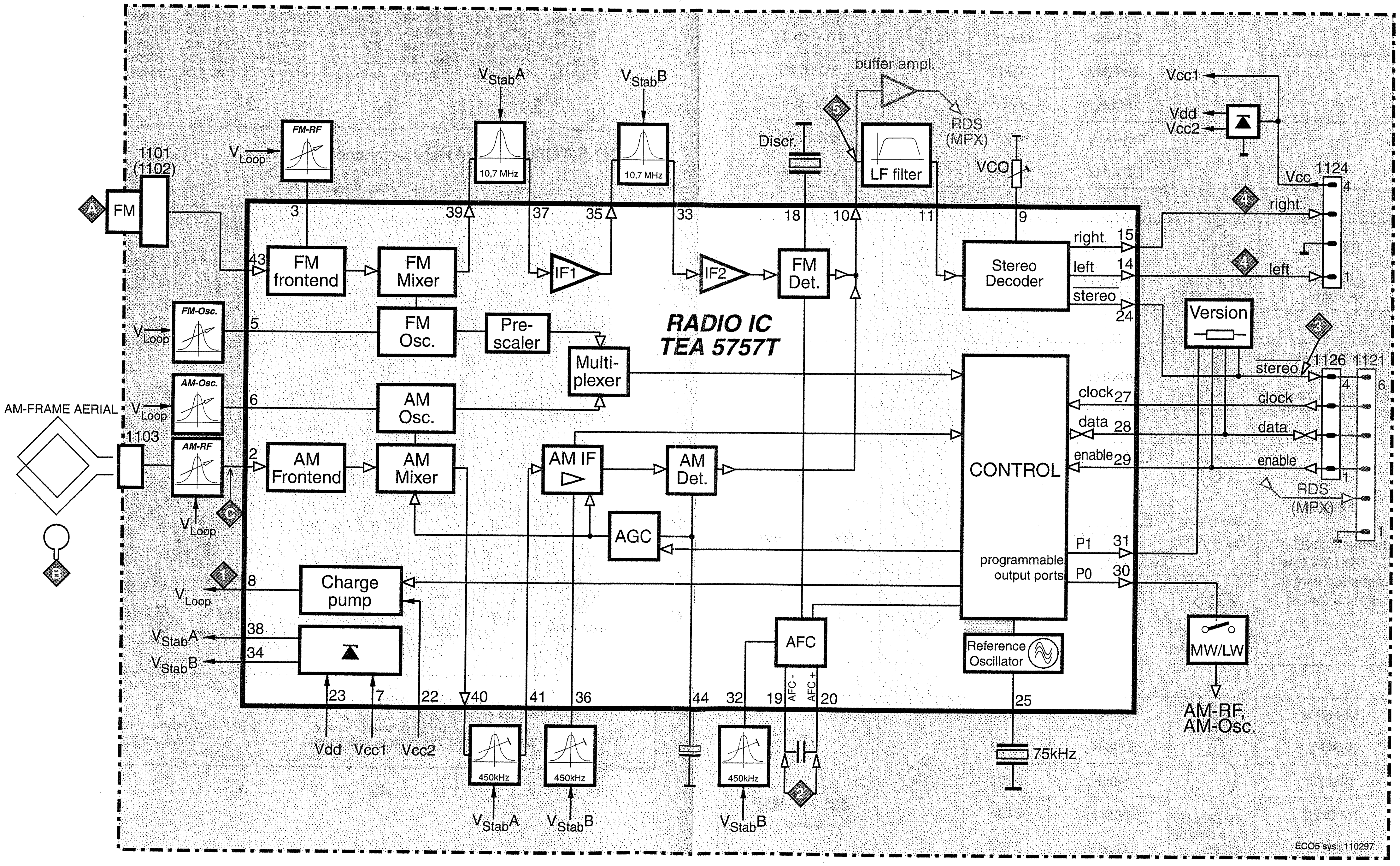
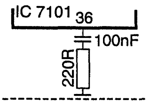
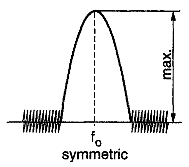
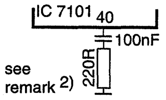
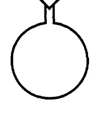
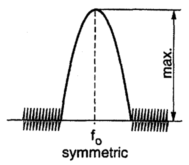
Blockdiagram ....................................................................7B-1
Adjustmant table ..............................................................7B-2
Component layout............................................................7B-2
Circuit diagram..................................................................7B-3
Partslist ............................................................................7B-4

## BLOCKDIAGRAM

### TUNER BOARD
### ECO 5 systems


RADIO IC
TEA 5757T
FM
1101
(1102)
A
FM-RF
$V_{Loop}$
$V_{Stab}A$
$V_{Stab}B$
10,7 MHz
10,7 MHz
buffer ampl.
RDS
(MPX)
Discr.
5
LF filter
VCO
Vcc1
Vdd
Vcc2
Vcc
1124
4
right
left
1
3
39
37
35
33
18
10
11
9
43
FM
frontend
FM
Mixer
IF1
IF2
FM
Det.
Stereo
Decoder
right 15
left 14
stereo
24
Version
FM-Osc.
5
FM
Osc.
Pre-
scaler
Multi-
plexer
stereo
1126
1121
AM-FRAME AERIAL
AM-Osc.
6
AM
Osc.
CONTROL
clock 27
clock
data 28
data
enable 29
enable
RDS
(MPX)
1103
AM-RF
2
AM
Frontend
AM
Mixer
AM IF
AM
Det.
C
AGC
B
P1 31
programmable
output ports
P0 30
8
Charge
pump
MW/LW
38
34
AFC
Reference
Oscillator
23
7
22
40
41
36
44
32
19
AFC -
AFC +
20
25
Vdd
Vcc1
Vcc2
450kHz
450kHz
450kHz
75kHz
AM-RF,
AM-Osc.
ECO5 sys., 110297

## TUNER ADJUSTMENT TABLE ( **ECO5** FM/MW- and FM/MW/LW - versions with AM-frame aerial )

| Waverange | Input frequency | Input | Tuned to | Adjust | Output | Scope/Voltmeter |
|---|---|---|---|---|---|---|
| *VARICAP ALIGNMENT* | | | | | | |
| **FM**<br>87.5 - 108MHz<br>(65.81 - 74, 87.5 - 108MHz) | | | 108MHz | 5130 | ◇1 | 8V ±0.2V |
| | | | 87.5MHz<br>(65.81MHz) | check | | 4.3V ±0.5V<br>(1.2V ±0.5V) |
| **MW**<br>FM/AM-version, 10kHz grid<br>530 - 1700kHz | | | 1700kHz | 5123 | | 8V ±0.2V |
| | | | 530kHz | check | | 1.1V ±0.4V |
| FM/MW-version, 9kHz grid<br>531 - 1602kHz | | | 1602kHz | 5123 | | 6.9V ±0.2V |
| | | | 531kHz | check | | 1.1V ±0.4V |
| **LW**<br>153 - 279kHz | | | 279kHz | 5122 | | 8V ±0.2V |
| | | | 153kHz | check | | 1.1V ±0.4V |
| **MW**<br>FM/MW/LW- version, 9kHz grid<br>531 - 1602kHz | | | 1602kHz | 5123 | | 8V ±0.2V |
| | | | 531kHz | check | | 1.1V ±0.4V |
| *FM RF* | | | | | | |
| **FM**<br>87.5 - 108MHz<br>(65.81 - 74, 87.5 - 108MHz) | 108MHz | ◇A | 108MHz | 2155 | ◇4 | MAX |
| | 87.5MHz<br>(65.81MHz) | mod=1kHz<br>Δf=±22.5kHz | 87.5MHz<br>(65.81MHz) | 5131 | | |
| *VCO* | | | | | | |
| **FM** | 98MHz, 1mV<br>continuous wave | ◇A | 98MHz | 3142 | ◇3 | 152kHz ±1kHz 1) |
| *AM IF* | | | | | | |
| **MW** | 450kHz<br>connect pin 26 of IC 7101 (AM Osc.) with short wire to ground (pin 4) | ◇C<br>Δf=±15kHz<br>$V_{RF}$ = 3mV |  IC 7101 36<br>100nF<br>220R | 5111 | ◇4 |  max.<br>f<sub>o</sub><br>symmetric |
| | | |  IC 7101 40<br>100nF<br>220R<br>see remark 2) | 5112 | | |
| *AM AFC*<br>**MW** | | ◇C<br>continuous wave<br>$V_{RF}$ = 10mV | | 5114 | ◇2 | 0 ± 2 mV DC |
| *AM RF* 3) | | | | | | |
| **MW** 4)<br>FM/MW/LW- and FM/MW-version<br>( 9kHz grid)<br>531 - 1602kHz | 1494kHz | ◇B<br> | 1494kHz | 2106 | ◇4 |  max.<br>fo<br>symmetric |
| | 558kHz | | 558kHz | 5102 | | |
| **LW** | 198kHz | | 198kHz | 5103 | | |
| **MW**<br>FM/AM-version, 10kHz grid<br>530 - 1700kHz | 1500kHz | Δf = ±30kHz<br>$V_{RF}$ as low as possible | 1500kHz | 2106 | | |
| | 560kHz | | 560kHz | 5102 | | |

ECO5, 170996

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

1) If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

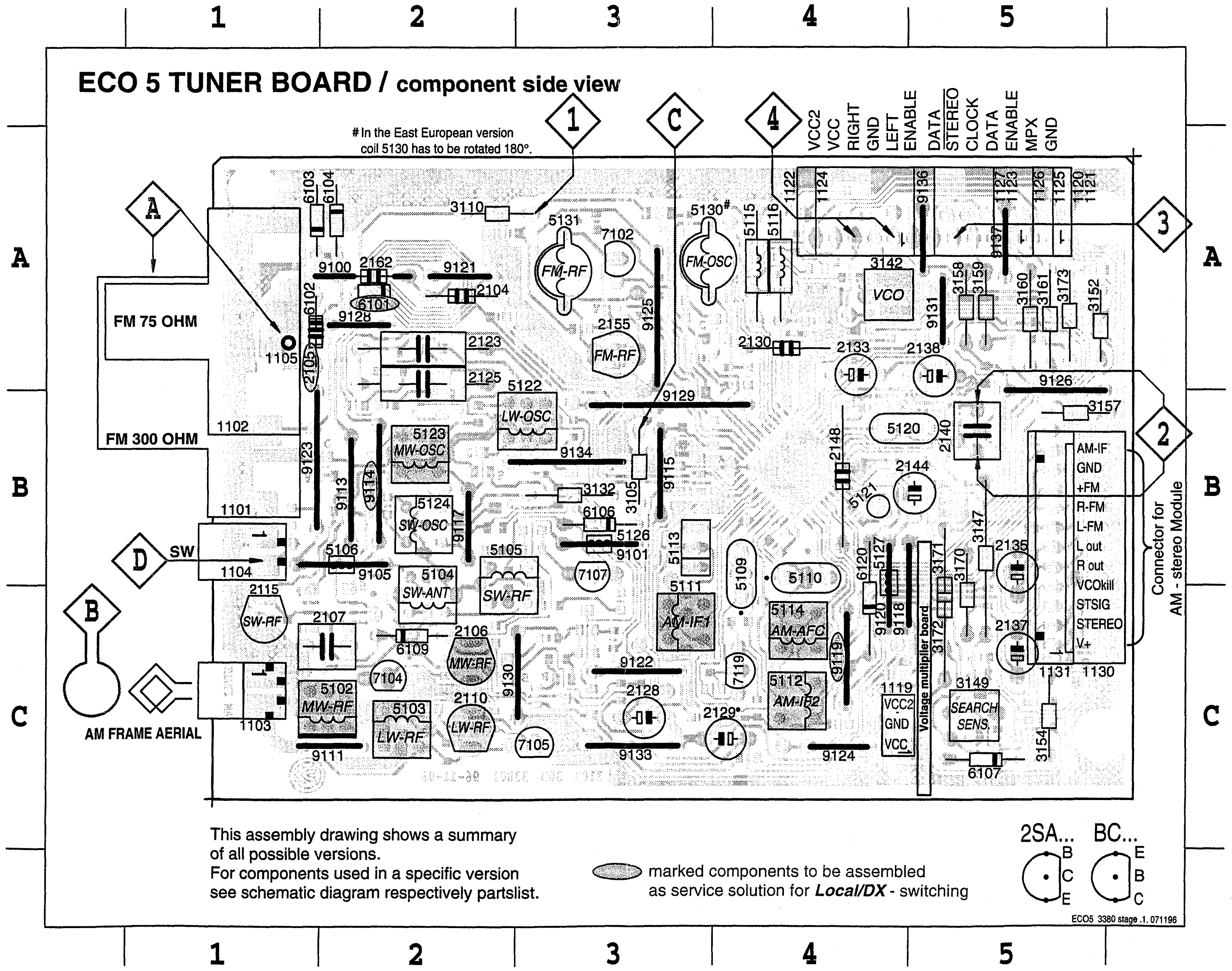
2) RC network serves for damping the IF-filter while adjusting the other one.

3) For AM RF adjustments the original frame antenna has to be used !

4) MW has to be aligned before LW.

↕ Repeat

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1101 | A1 | 2106 | C2 | 2137 | C5 | 3147 | B5 | 3172 | C5 | 5112 | C4 | 5130 | A3 | 7104 | C2 | 9118 | B4 | 9130 | C3 |
| 1102 | A1 | 2107 | C2 | 2138 | A5 | 3149 | C5 | 3173 | A5 | 5113 | B3 | 5131 | A3 | 7105 | C3 | 9119 | C4 | 9131 | A5 |
| 1103 | C1 | 2110 | C2 | 2140 | B5 | 3152 | A5 | 5102 | C2 | 5114 | C4 | 6101 | A2 | 7107 | B3 | 9120 | B4 | 9133 | C3 |
| 1104 | B1 | 2115 | C1 | 2144 | B5 | 3154 | C5 | 5103 | C2 | 5115 | A4 | 6102 | A1 | 9100 | A2 | 9121 | A2 | 9134 | B3 |
| 1105 | A1 | 2123 | A2 | 2148 | B4 | 3157 | B5 | 5104 | C2 | 5116 | A4 | 6103 | A1 | 9101 | B3 | 9122 | C3 | 9136 | A5 |
| 1119 | C5 | 2125 | A2 | 2155 | A3 | 3158 | A5 | 5105 | B2 | 5120 | B4 | 6104 | A2 | 9105 | B2 | 9123 | B1 | 9137 | A5 |
| 1120 | A5 | 2128 | C3 | 2162 | A2 | 3159 | A5 | 5106 | B2 | 5121 | B4 | 6106 | B3 | 9111 | C2 | 9124 | C4 | | |
| 1130 | B5 | 2129 | C4 | 3105 | B3 | 3160 | A5 | 5108 | C4 | 5122 | B3 | 6107 | C5 | 9113 | B2 | 9125 | A3 | | |
| 1131 | B5 | 2130 | A4 | 3110 | A2 | 3161 | A5 | 5109 | B4 | 5123 | B2 | 6109 | C2 | 9114 | B2 | 9126 | B5 | | |
| 2104 | A2 | 2133 | A4 | 3132 | B3 | 3170 | C5 | 5110 | B4 | 5124 | B2 | 6120 | C4 | 9115 | B3 | 9128 | A2 | | |
| 2105 | A1 | 2135 | B5 | 3142 | A4 | 3171 | C5 | 5111 | C3 | 5126 | B3 | 7102 | A3 | 9117 | B2 | 9129 | B3 | | |



**ECO 5 TUNER BOARD / component side view**

# In the East European version coil 5130 has to be rotated 180°.

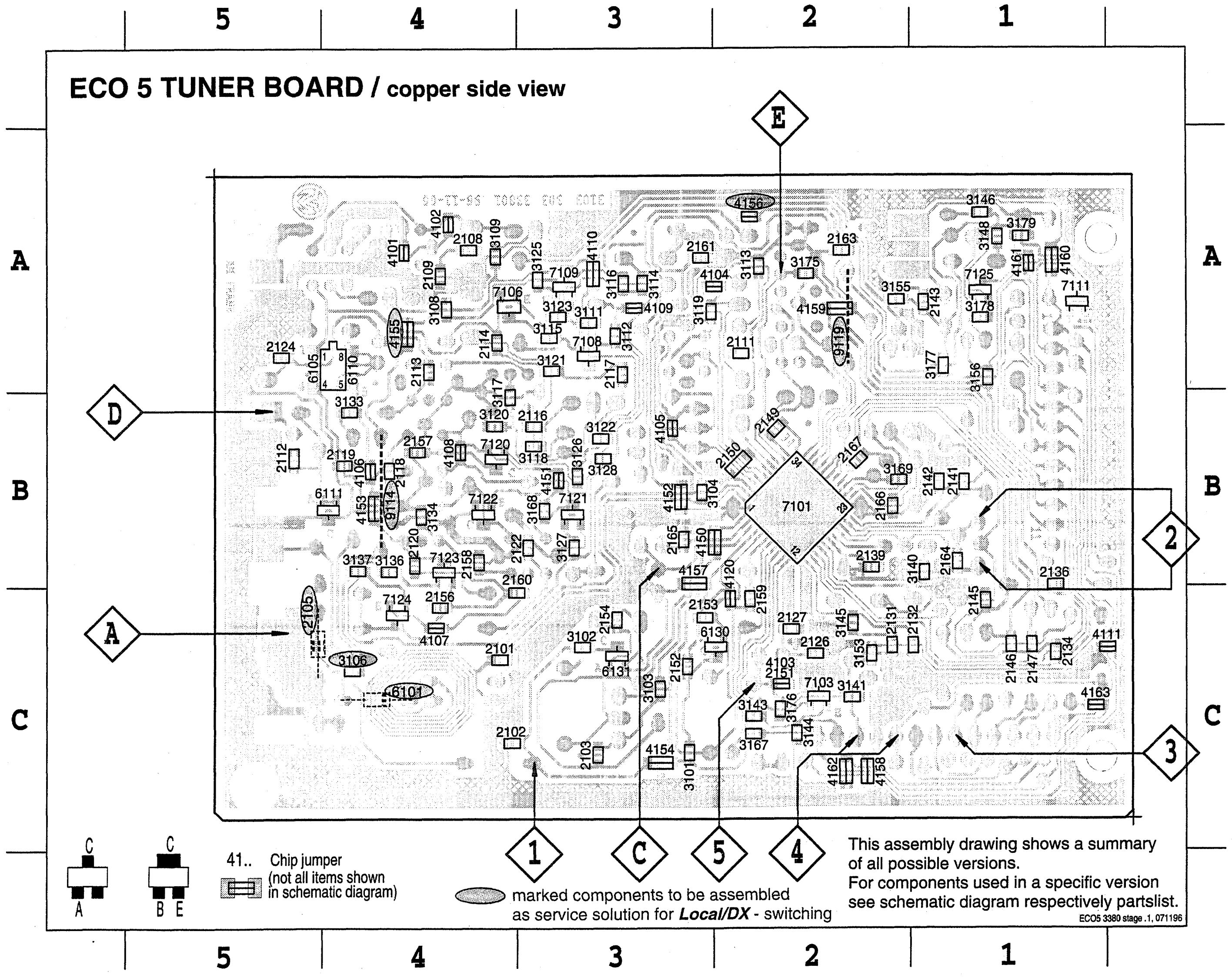
1
2
3
4
5
A
B
C
VCC2
VCC
RIGHT
GND
LEFT
ENABLE
DATA
STEREO
CLOCK
DATA
ENABLE
MPX
GND
FM 75 OHM
FM 300 OHM
SW
AM FRAME AERIAL
FM-RF
FM-OSC
VCO
LW-OSC
MW-OSC
SW-OSC
SW-ANT
SW-RF
MW-RF
LW-RF
AM-IF1
AM-IF2
AM-AFC
SEARCH SENS.
Voltage multiplier board
AM-IF
GND
+FM
R-FM
L-FM
L out
R out
VCOkill
STSIG
STEREO
V+
Connector for AM - stereo Module
VCC2
GND
VCC
2SA...
BC...
B
C
E
ECO5 3380 stage 1, 071196

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for ***Local/DX*** - switching

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2101 | C4 | 2119 | B4 | 2141 | B1 | 2154 | C3 | 3101 | C3 | 3116 | A3 | 3133 | B4 | 3153 | C2 | 4103 | C2 | 4151 | B3 | 6110 | A4 | 7121 | B3 |
| 2102 | C4 | 2120 | B4 | 2142 | B1 | 2156 | C4 | 3102 | C3 | 3117 | B4 | 3134 | B4 | 3155 | A2 | 4104 | A2 | 4152 | B3 | 6111 | B4 | 7122 | B4 |
| 2103 | C3 | 2122 | B3 | 2143 | A1 | 2157 | B4 | 3103 | C3 | 3118 | B3 | 3136 | B4 | 3156 | A1 | 4105 | B3 | 4153 | B4 | 6130 | C2 | 7123 | B4 |
| 2108 | A4 | 2124 | A5 | 2145 | C1 | 2158 | B4 | 3104 | B3 | 3120 | B4 | 3137 | B4 | 3167 | C2 | 4106 | B4 | 4154 | C3 | 6131 | C3 | 7124 | C4 |
| 2109 | A4 | 2126 | C2 | 2146 | C1 | 2159 | C2 | 3106 | C4 | 3121 | A3 | 3140 | B1 | 3168 | B3 | 4107 | C4 | 4155 | A4 | 7101 | B2 | | |
| 2112 | B5 | 2127 | C2 | 2147 | C1 | 2160 | C4 | 3108 | A4 | 3122 | B3 | 3141 | C2 | 3169 | B2 | 4108 | B4 | 4156 | A2 | 7103 | C2 | | |
| 2113 | A4 | 2131 | C2 | 2149 | B2 | 2161 | A3 | 3109 | A4 | 3123 | A3 | 3143 | C2 | 3175 | A2 | 4109 | A3 | 4157 | B3 | 7106 | A4 | | |
| 2114 | A4 | 2132 | C1 | 2150 | B2 | 2163 | A2 | 3111 | A3 | 3125 | A3 | 3144 | C2 | 3176 | C2 | 4110 | A3 | 4158 | C2 | 7108 | A3 | | |
| 2116 | B3 | 2134 | C1 | 2151 | C2 | 2165 | B3 | 3112 | A3 | 3126 | B3 | 3145 | C2 | 3177 | A1 | 4111 | C1 | 4159 | A2 | 7109 | A3 | | |
| 2117 | A3 | 2136 | B1 | 2152 | C3 | 2166 | B2 | 3114 | A3 | 3127 | B3 | 3146 | A1 | 4101 | A4 | 4120 | C2 | 4160 | A1 | 7111 | A1 | | |
| 2118 | B4 | 2139 | B2 | 2153 | C3 | 2167 | B2 | 3115 | A3 | 3128 | B3 | 3148 | A1 | 4102 | A4 | 4150 | B2 | 6105 | A4 | 7120 | B4 | | |

## ECO 5 TUNER BOARD / copper side view



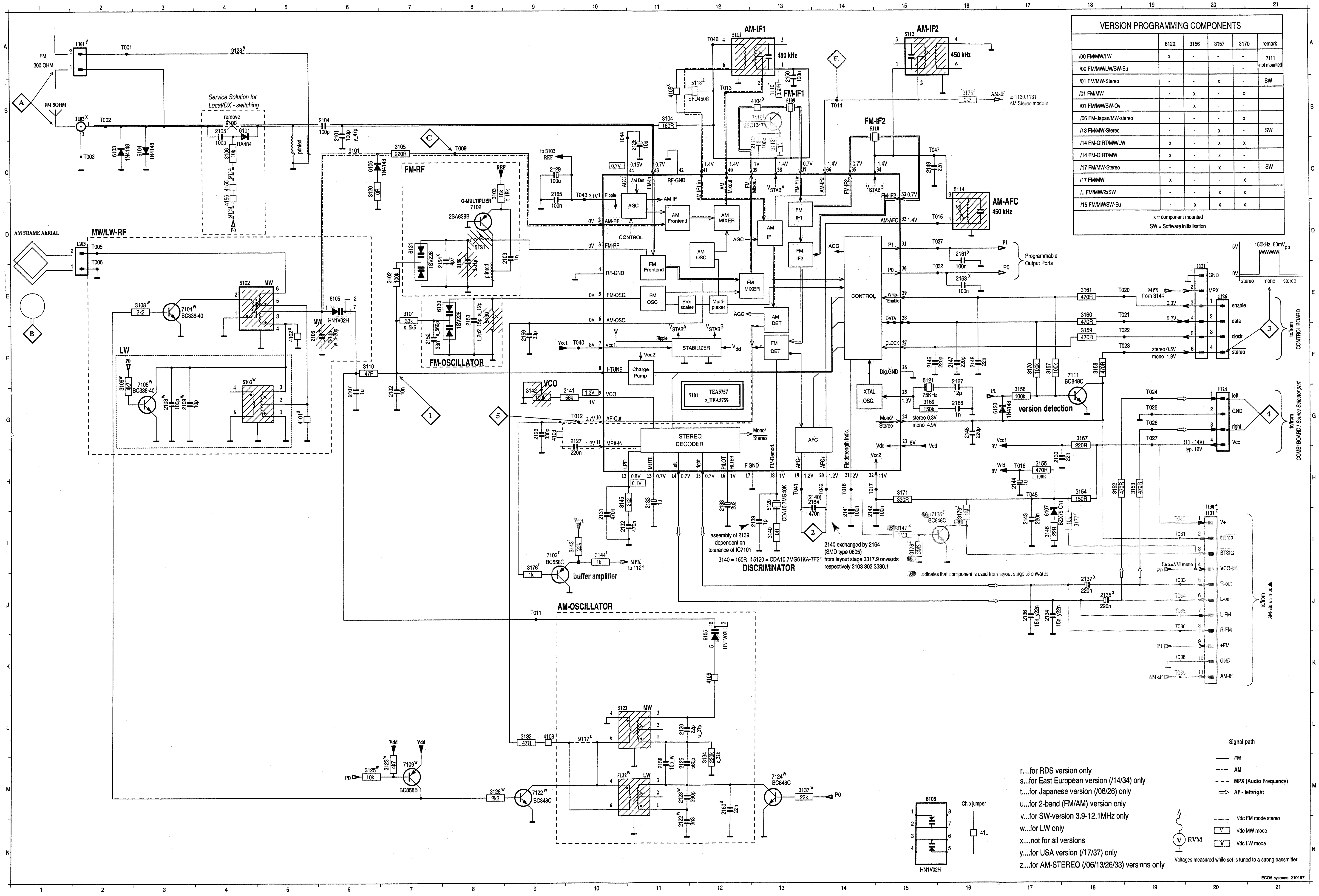
41.. Chip jumper
(not all items shown
in schematic diagram)

marked components to be assembled
as service solution for ***Local/DX*** - switching

This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

ECO5 3380 stage .1. 071196

# TUNER BOARD ECO5 / Systems


FM 300 OHM
FM 50OHM
AM FRAME AERIAL
MW/LW-RF
LW
MW
Service Solution for Local/DX - switching
remove 9100
FM-RF
Q-MULTIPLIER 7102
2SA838B
FM-OSCILLATOR
AM-IF1
450 kHz
FM-IF1
2SC1047
SFU450B
AM-IF2
FM-IF2
AM-AFC
450 kHz
AGC
AM Det.
AM IF
AM Frontend
AM MIXER
CONTROL
AM IF
FM IF1
FM IF2
FM Frontend
AM OSC
FM MIXER
FM OSC
Pre-scaler
Multi-plexer
AM DET
FM DET
STABILIZER
Charge Pump
TEA5757
z_TEA5759
7101
VCO
XTAL OSC.
STEREO DECODER
AFC
DISCRIMINATOR
buffer amplifier
AM-OSCILLATOR
version detection
Programmable Output Ports
to/from CONTROL BOARD
to/from COMBI BOARD / Source Selector part
to/from AM-stereo module
150kHz, 50mVpp
5V
0V
stereo
mono
stereo
Chip jumper
HN1V02H
2140 exchanged by 2164 (SMD type 0805)
3140 = 150R if 5120 = CDA10.7MG61KA-TF21
from layout stage 3317.9 onwards respectively 3103 303 3380.1
assembly of 2139 dependent on tolerance of IC7101
.8 indicates that component is used from layout stage .8 onwards
ECO5 systems, 210197

| VERSION PROGRAMMING COMPONENTS | 6120 | 3156 | 3157 | 3170 | remark |
|---|---|---|---|---|---|
| /00 FM/MW/LW | x | - | - | - | 7111 not mounted |
| /00 FM/MW/LW/SW-Eu | - | - | - | - | |
| /01 FM/MW-Stereo | - | - | x | - | SW |
| /01 FM/MW | - | x | - | x | |
| /01 FM/MW/SW-Ov | - | x | - | - | |
| /06 FM-Japan/MW-stereo | - | - | - | x | |
| /13 FM/MW-Stereo | - | - | x | - | SW |
| /14 FM-OIRT/MW/LW | x | - | x | x | |
| /14 FM-OIRT/MW | x | - | x | - | |
| /17 FM/MW-Stereo | - | - | x | - | SW |
| /17 FM/MW | x | - | - | x | |
| /.. FM/MW/2xSW | - | - | x | x | |
| /15 FM/MW/SW-Eu | - | x | x | x | |

x = component mounted
SW = Software initialisation

r....for RDS version only
s...for East European version (/14/34) only
t....for Japanese version (/06/26) only
u...for 2-band (FM/AM) version only
v...for SW-version 3.9-12.1MHz only
w...for LW only
x....not for all versions
y....for USA version (/17/37) only
z....for AM-STEREO (/06/13/26/33) versions only

Signal path

— FM
-·- AM
- - - MPX (Audio Frequency)
⇨ AF - left/right

EVM

........ Vdc FM mode stereo
V Vdc MW mode
V Vdc LW mode

Voltages measured while set is tuned to a strong transmitter

| | |
|---|---|
| 1101 | A 1 |
| 1102 | B 2 |
| 1103 | D 2 |
| 1121 | E20 |
| 1124 | G20 |
| 1126 | E20 |
| 1130 | I20 |
| 1131 | I20 |
| 2101 | C 6 |
| 2102 | G 7 |
| 2103 | D 9 |
| 2104 | B 6 |
| 2106 | F 5 |
| 2107 | G 6 |
| 2108 | G 3 |
| 2109 | G 3 |
| 2111 | C13 |
| 2120 | L11 |
| 2122 | N11 |
| 2123 | M11 |
| 2125 | M11 |
| 2126 | G 9 |
| 2127 | G10 |
| 2128 | C11 |
| 2129 | C 9 |
| 2130 | H17 |
| 2131 | I10 |
| 2132 | I10 |
| 2133 | H11 |
| 2134 | J17 |
| 2135 | J18 |
| 2136 | J17 |
| 2137 | J18 |
| 2138 | H12 |
| 2139 | I13 |
| 2140 | H14 |
| 2141 | H14 |
| 2142 | H14 |
| 2143 | I17 |
| 2144 | H17 |
| 2145 | G16 |
| 2146 | F15 |
| 2147 | F16 |
| 2148 | F16 |
| 2149 | C15 |
| 2150 | B13 |
| 2152 | F 7 |
| 2153 | E 8 |
| 2154 | E 7 |
| 2155 | D 8 |
| 2158 | M11 |
| 2159 | F 9 |
| 2160 | M12 |
| 2161 | D16 |
| 2163 | E16 |
| 2164 | H14 |
| 2165 | C 9 |
| 2166 | G16 |
| 2167 | F16 |
| 3101 | E 7 |
| 3102 | E 7 |
| 3103 | C 8 |
| 3104 | B11 |
| 3105 | C 7 |
| 3108 | E 3 |
| 3109 | F 2 |
| 3110 | F 6 |
| 3113 | C13 |
| 3119 | B13 |
| 3120 | C 6 |
| 3123 | M 7 |
| 3125 | M 6 |
| 3128 | M 8 |
| 3132 | L 9 |
| 3134 | M12 |
| 3137 | M13 |
| 3140 | I13 |
| 3141 | G10 |
| 3142 | G 9 |
| 3143 | I10 |
| 3144 | I10 |
| 3145 | H10 |
| 3146 | I17 |
| 3147 | I15 |
| 3152 | H18 |
| 3153 | H19 |
| 3154 | H18 |
| 3155 | H17 |
| 3156 | G17 |
| 3157 | F17 |
| 3158 | F18 |
| 3159 | F18 |
| 3160 | E18 |
| 3161 | E18 |
| 3167 | G18 |
| 3169 | G15 |
| 3170 | F17 |
| 3171 | H15 |
| 3175 | B16 |
| 3176 | J 9 |
| 3177 | I18 |
| 3178 | I15 |
| 3179 | I16 |
| 4101 | G 5 |
| 4102 | F 5 |
| 4103 | G 9 |
| 4104 | B13 |
| 4105 | B11 |
| 4106 | K12 |
| 4108 | L 9 |
| 5102 | E 4 |
| 5103 | F 4 |
| 5109 | B13 |
| 5110 | B14 |
| 5111 | A13 |
| 5112 | A15 |
| 5113 | B12 |
| 5114 | C16 |
| 5120 | H13 |
| 5121 | F15 |
| 5122 | M11 |
| 5123 | L11 |
| 5130 | E 8 |
| 5131 | D 8 |
| 6103 | C 2 |
| 6104 | C 3 |
| 6105 | K12 |
| 6105 | E 6 |
| 6106 | C 6 |
| 6107 | H17 |
| 6120 | G16 |
| 6130 | E 7 |
| 6131 | D 7 |
| 7101 | G11 |
| 7102 | D 8 |
| 7103 | I 9 |
| 7104 | E 3 |
| 7105 | F 2 |
| 7109 | M 7 |
| 7111 | F18 |
| 7119 | B13 |
| 7122 | M 9 |
| 7124 | M13 |
| 7125 | I16 |
| 9100 | B 4 |
| 9101 | C 6 |
| 9117 | L10 |
| 9128 | A 4 |

## *ELECTRICAL PARTSLIST ECO5 TUNER BOARD*

### MISCELLANEOUS

| | | |
|---|---|---|
| 1101 | 4822 267 31505 | ANTENNA SOCKET, 300Ω |
| 1102 | 4822 267 10283 | ANTENNA SOCKET, COAX IEC 75Ω |

### CAPACITORS

| | | | | | |
|---|---|---|---|---|---|
| 2101 © | 5322 122 32531 | 100pF | 5% | 50V | |
| 2102 © | 4822 122 33177 | 10nF | 20% | 50V | |
| 2103 © | 5322 122 34123 | 1nF | 10% | 50V | |
| 2104 | 4822 122 33195 | 100pF | 10% | 50V | |
| 2106 | 4822 125 60101 | 3-11pF TRIMCAP. | | | |
| 2107 | 4822 121 51319 | 1µF | 20% | 50V | |
| 2120 © | 5322 122 32658 | 22pF | 5% | 50V | |
| 2125 | 4822 121 51381 | 560pF | 1% | 400V | |
| 2126 © | 5322 122 31863 | 330pF | 5% | 50V | |
| 2127 © | 4822 122 32927 | 220nF | 10% | 63V | |
| 2127 © | 4822 126 13473 | 220nF | 20% | 50V | |
| 2128 | 4822 124 41579 | 10µF | 20% | 50V | |
| 2129 | 4822 124 41584 | 100µF | 20% | 10V | |
| 2130 | 4822 126 11585 | 22nF | 20% | 50V | |
| 2131 © | 4822 122 33325 | 470nF | 20% | 50V | |
| 2131 © | 4822 126 13482 | 470nF | 20% | 16V | |
| 2132 © | 4822 122 33325 | 470nF | 20% | 50V | |
| 2132 © | 4822 126 13482 | 470nF | 20% | 16V | |
| 2133 | 4822 124 40242 | 1µF | 20% | 63V | |
| 2134 © | 4822 122 33128 | 15nF | 10% | 63V | not for USA |
| 2134 © | 5322 122 32654 | 22nF | 10% | 63V | for USA only |
| 2135 | 4822 124 40746 | 0,22µF | 20% | 63V | |
| 2136 © | 4822 122 33128 | 15nF | 10% | 63V | not for USA |
| 2136 © | 5322 122 32654 | 22nF | 10% | 63V | for USA only |
| 2137 | 4822 124 40746 | 0,22µF | 20% | 63V | |
| 2138 | 4822 124 41576 | 2,2µF | 20% | 50V | |
| 2139 © | 5322 122 32447 | 1pF | 5% | 50V | |
| 2141 © | 4822 126 10002 | 100nF | 20% | 50V | |
| 2142 © | 4822 126 10002 | 100nF | 20% | 50V | |
| 2143 © | 4822 126 13473 | 220nF | 20% | 50V | |
| 2144 | 4822 124 40242 | 1µF | 20% | 63V | |
| 2145 © | 4822 122 33575 | 220pF | 5% | 50V | |
| 2146 © | 4822 122 33575 | 220pF | 5% | 50V | |
| 2147 © | 4822 122 33575 | 220pF | 5% | 50V | |
| 2148 | 4822 126 11585 | 22nF | 20% | 50V | |
| 2149 © | 5322 122 32654 | 22nF | 10% | 63V | |
| 2150 © | 4822 122 31947 | 100nF | 20% | 50V | |
| 2152 © | 4822 122 33342 | 33nF | 10% | 63V | not for East Europe |
| 2152 © | 5322 116 80853 | 560pF | 5% | 63V | for East Europe only |
| 2153 © | 4822 122 32139 | 12pF | 5% | 63V | for East Europe only |
| 2153 © | 5322 122 32481 | 15pF | 5% | 50V | not for East Europe |
| 2155 | 4822 125 60101 | 3-11pF TRIMCAP. | | | |
| 2159 © | 5322 122 32659 | 33pF | 5% | 50V | |
| 2160 © | 5322 122 32654 | 22nF | 10% | 63V | |
| 2164 © | 4822 126 13482 | 470nF | 20% | 16V | |
| 2165 © | 4822 126 10002 | 100nF | 20% | 50V | |
| 2166 © | 5322 122 34123 | 1nF | 10% | 50V | |
| 2167 © | 4822 122 32139 | 12pF | 5% | 63V | |

### RESISTORS

| | | | | | |
|---|---|---|---|---|---|
| 3101 © | 4822 051 20333 | 33kΩ | 5% | 0,1W | not for East Europe |
| 3101 © | 4822 051 20562 | 5,6kΩ | 5% | 0,1W | for East Europe only |
| 3102 © | 4822 051 20104 | 100kΩ | 5% | 0,1W | |
| 3103 © | 4822 051 20183 | 18kΩ | 5% | 0,1W | |
| 3104 © | 4822 117 11448 | 180Ω | 10% | 0,1W | |
| 3105 | 4822 116 83872 | 220Ω | 5% | 0,5W | |
| 3110 | 4822 116 52195 | 47Ω | 5% | 0,5W | |
| 3120 © | 4822 051 20008 | CHIP JUMPER 0805 | | | |

### RESISTORS

| | | | | | |
|---|---|---|---|---|---|
| 3132 | 4822 116 52195 | 47Ω | 5% | 0,5W | |
| 3134 © | 4822 051 20224 | 220kΩ | 5% | 0,1W | |
| 3140 © | 4822 051 20008 | CHIP JUMPER 0805 | | | 5120=CDA10.7MG40K |
| 3140 © | 4822 117 10353 | 150Ω | 5% | 0,1W | 5120=CDA10.7MG61KA |
| 3141 © | 4822 051 20563 | 56kΩ | 5% | 0,1W | |
| 3142 | 4822 100 11163 | 100kΩ TRIMPOT. LIN. | | | |
| 3143 © | 4822 051 20223 | 22kΩ | 5% | 0,1W | for RDS version only |
| 3144 © | 4822 051 10102 | 1kΩ | 5% | 0,1W | for RDS version only |
| 3145 © | 4822 117 11449 | 2,2kΩ | 1% | 0,1W | |
| 3146 © | 4822 051 20229 | 22Ω | 5% | 0,1W | |
| 3152 | 4822 116 83883 | 470Ω | 5% | 0,16W | |
| 3153 © | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3154 | 4822 116 83868 | 150Ω | 5% | 0,5W | |
| 3155 © | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3156 © | 4822 051 20104 | 100kΩ | 5% | 0,1W | for /21/30/33 only |
| 3157 | 4822 116 52234 | 100kΩ | 5% | 0,5W | for East Europe only |
| 3158 | 4822 116 83883 | 470Ω | 5% | 0,16W | |
| 3159 | 4822 116 83883 | 470Ω | 5% | 0,16W | |
| 3160 | 4822 116 83883 | 470Ω | 5% | 0,16W | |
| 3161 | 4822 116 83883 | 470Ω | 5% | 0,16W | |
| 3167 © | 4822 117 11503 | 220Ω | 5% | 0,1W | |
| 3169 © | 4822 051 20154 | 150kΩ | 5% | 0,1W | |
| 3170 | 4822 116 52234 | 100kΩ | 5% | 0,5W | |
| 3171 | 4822 116 52219 | 330Ω | 5% | 0,5W | |
| 3176 © | 4822 051 10102 | 1kΩ | 5% | 0,1W | for RDS version only |
| 4101 © | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4102 © | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4103 © | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4104 © | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4105 © | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4106 © | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4108 © | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4111 © | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4120 © | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4150 © | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4152 © | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4153 © | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4154 © | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4157 © | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4158 © | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4159 © | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4162 © | 4822 051 10008 | CHIP JUMPER 1206 | | | for RDS version only |

### COILS

| | | |
|---|---|---|
| 5102 | 4822 157 71634 | RF-COIL MW |
| 5109 | 4822 242 70665 | CER. FILTER 10,7MHZ |
| 5110 | 4822 242 70665 | CER. FILTER 10,7MHZ |
| 5111 | 4822 158 60511 | AM-IF FILTER 450kHz |
| 5112 | 4822 157 70302 | AM-IF FILTER 450kHz |
| 5114 | 4822 157 70302 | AM-IF FILTER 450kHz (AM AFC) |
| 5120 | 4822 242 10251 | CER. DISCRIMINATOR 10.7MG61KA-TF21 |
| 5120 | 4822 242 82065 | CER. DISCRIMINATOR 10.7MG40K |
| 5121 | 4822 242 10261 | QUARTZ 75kHz |
| 5123 | 4822 157 60517 | OSC. COIL MW |
| 5130 | 4822 156 30947 | RF COIL 1,5 TURNS |
| 5131 | 4822 156 30947 | RF COIL 1,5 TURNS |

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## *ELECTRICAL PARTSLIST ECO5 TUNER BOARD*

### DIODES

| | | | |
|---|---|---|---|
| 6103 | 4822 130 30621 | 1N4148 | |
| 6104 | 4822 130 30621 | 1N4148 | |
| 6105 © | 4822 130 83075 | HN1V02H | |
| 6106 | 4822 130 30621 | 1N4148 | |
| 6107 | 4822 130 34488 | BZX79-C11 | |
| 6120 | 4822 130 30621 | 1N4148 | not for /21/30/33 |
| 6130 © | 4822 130 82833 | 1SV228 | |
| 6131 © | 4822 130 82833 | 1SV228 | |

### TRANSISTORS

| | | | |
|---|---|---|---|
| 7102 | 4822 130 60093 | 2SA838B | |
| 7103 © | 4822 130 42513 | BC558C | for RDS version only |
| 7111 © | 5322 130 42136 | BC848C | |

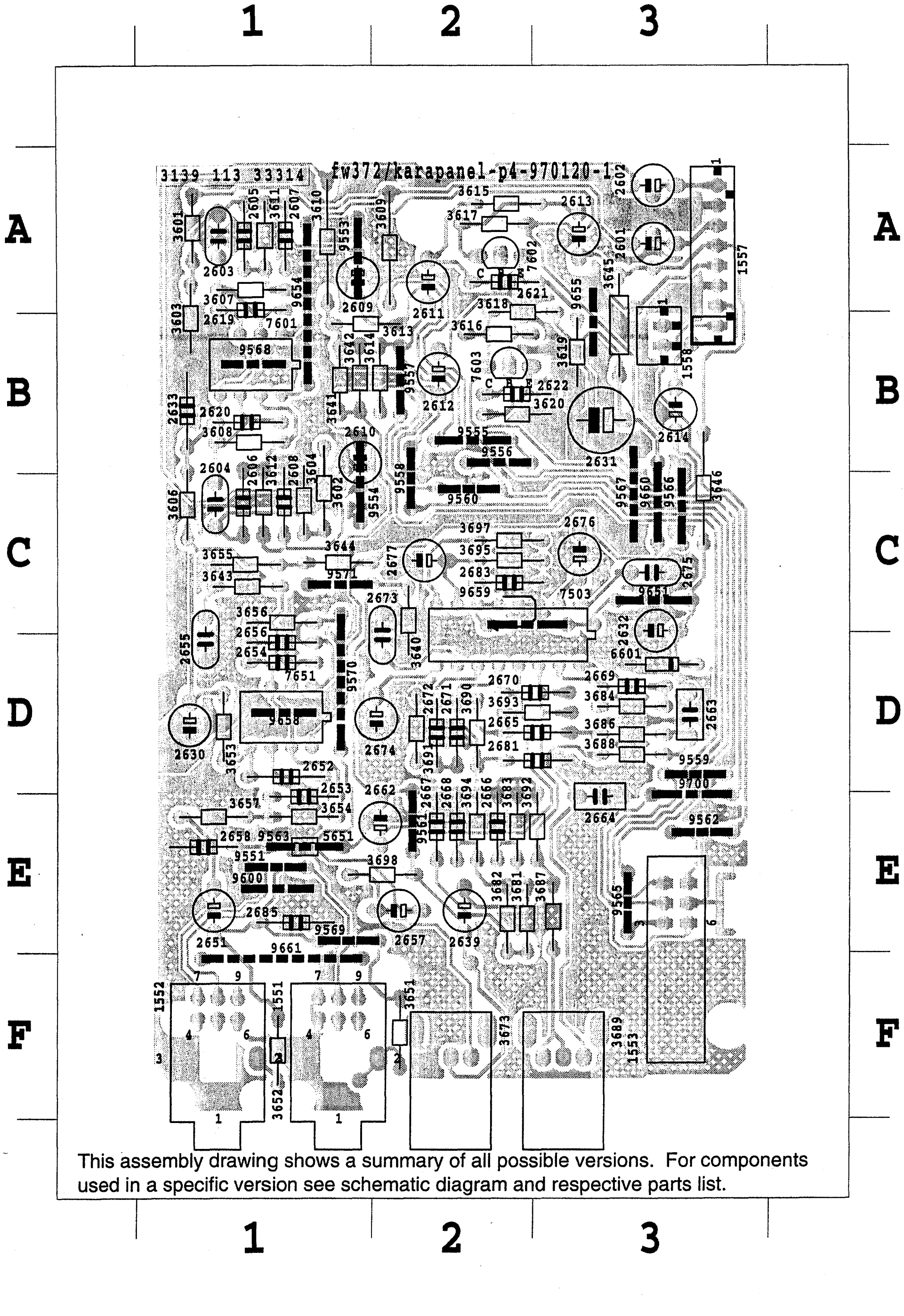
### INTEGRATED CIRCUITS

| | | |
|---|---|---|
| 7101 © | 4822 209 90924 | TEA5757H/V1, RADIO IC |

# KARAOKE BOARD

Component Layout .............................................................. 8 - 2
Circuit Diagram ...................................................................... 8 - 3
Partlist ..................................................................................... 8 - 4

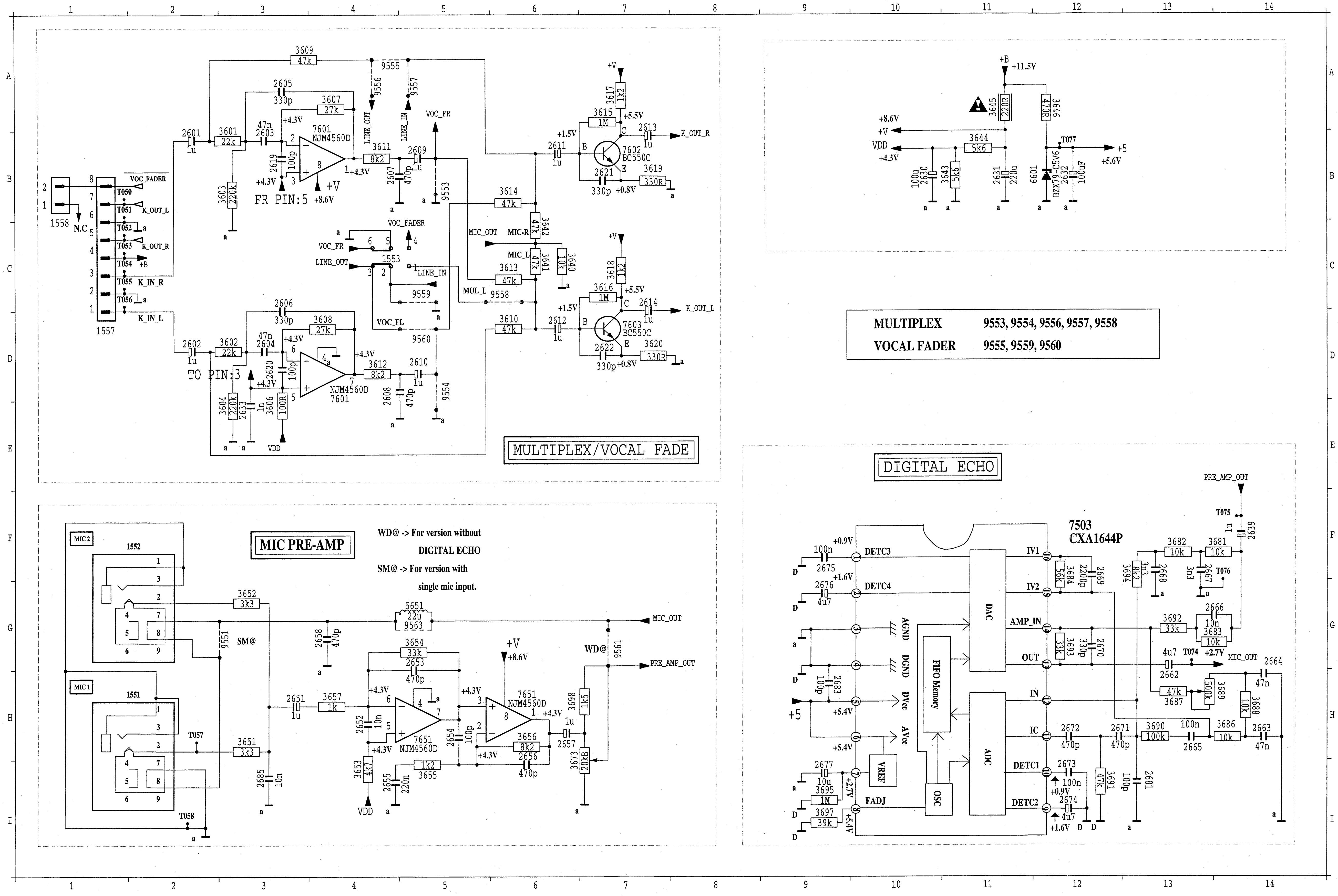
# COMPONENT LAYOUT



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

| | | |
|---|---|---|
| 1551 | F | 1 |
| 1552 | F | 1 |
| 1553 | E | 3 |
| 1557 | A | 3 |
| 1558 | B | 3 |
| 2601 | A | 3 |
| 2602 | A | 3 |
| 2603 | A | 1 |
| 2604 | C | 1 |
| 2605 | A | 1 |
| 2606 | C | 1 |
| 2607 | A | 1 |
| 2608 | C | 1 |
| 2609 | A | 1 |
| 2610 | B | 1 |
| 2611 | A | 2 |
| 2612 | B | 2 |
| 2613 | A | 3 |
| 2614 | B | 3 |
| 2619 | A | 1 |
| 2620 | B | 1 |
| 2621 | A | 2 |
| 2622 | B | 2 |
| 2630 | D | 1 |
| 2631 | B | 3 |
| 2632 | C | 3 |
| 2633 | B | 1 |
| 2639 | E | 2 |
| 2651 | E | 1 |
| 2652 | D | 1 |
| 2653 | E | 1 |
| 2654 | D | 1 |
| 2655 | D | 1 |
| 2656 | D | 1 |
| 2657 | E | 2 |
| 2658 | E | 1 |
| 2662 | E | 2 |
| 2663 | D | 3 |
| 2664 | E | 3 |
| 2665 | D | 3 |
| 2666 | E | 2 |
| 2667 | E | 2 |
| 2668 | E | 2 |
| 2669 | D | 3 |
| 2670 | D | 3 |
| 2671 | D | 2 |
| 2672 | D | 2 |
| 2673 | D | 2 |
| 2674 | D | 2 |
| 2675 | C | 3 |
| 2676 | C | 3 |
| 2677 | C | 2 |
| 2681 | D | 3 |
| 2683 | C | 2 |
| 2685 | E | 1 |
| 3601 | A | 1 |
| 3602 | C | 1 |
| 3603 | B | 1 |
| 3604 | C | 1 |
| 3606 | C | 1 |
| 3607 | A | 1 |
| 3608 | B | 1 |
| 3609 | A | 2 |
| 3610 | A | 1 |
| 3611 | A | 1 |
| 3612 | C | 1 |
| 3613 | B | 1 |
| 3614 | B | 2 |
| 3615 | A | 2 |
| 3616 | B | 2 |
| 3617 | A | 2 |
| 3618 | B | 2 |
| 3619 | B | 3 |
| 3620 | B | 2 |
| 3640 | C | 2 |
| 3641 | B | 1 |
| 3642 | B | 1 |
| 3643 | C | 1 |
| 3644 | C | 1 |
| 3645 | B | 3 |
| 3646 | C | 3 |
| 3651 | F | 2 |
| 3652 | F | 1 |
| 3653 | D | 1 |
| 3654 | E | 1 |
| 3655 | C | 1 |
| 3656 | C | 1 |
| 3657 | E | 1 |
| 3673 | F | 2 |
| 3681 | E | 2 |
| 3682 | E | 2 |
| 3683 | E | 2 |
| 3684 | D | 3 |
| 3686 | D | 3 |
| 3687 | E | 3 |
| 3688 | D | 3 |
| 3689 | F | 3 |
| 3690 | D | 2 |
| 3691 | D | 2 |
| 3692 | E | 3 |
| 3693 | D | 3 |
| 3694 | E | 2 |
| 3695 | C | 2 |
| 3697 | C | 2 |
| 3698 | E | 2 |
| 5651 | E | 1 |
| 6601 | D | 3 |
| 7503 | D | 2 |
| 7601 | B | 1 |
| 7602 | A | 2 |
| 7603 | B | 2 |
| 7651 | D | 1 |
| 9551 | E | 1 |
| 9553 | A | 1 |
| 9554 | C | 1 |
| 9555 | B | 2 |
| 9556 | B | 2 |
| 9557 | B | 2 |
| 9558 | C | 2 |
| 9559 | D | 3 |
| 9560 | C | 2 |
| 9561 | E | 2 |
| 9562 | E | 3 |
| 9563 | E | 1 |
| 9565 | E | 3 |
| 9566 | C | 3 |
| 9567 | C | 3 |
| 9568 | B | 1 |
| 9569 | E | 1 |
| 9570 | D | 1 |
| 9571 | C | 1 |
| 9600 | E | 1 |
| 9651 | C | 3 |
| 9654 | A | 1 |
| 9655 | B | 3 |
| 9658 | D | 1 |
| 9659 | C | 2 |
| 9660 | C | 3 |
| 9661 | F | 1 |
| 9700 | E | 3 |

# KARAOKE CIRCUIT


MULTIPLEX/VOCAL FADE
MIC PRE-AMP
DIGITAL ECHO
7601 NJM4560D
7602 BC550C
7603 BC550C
7651 NJM4560D
7503 CXA1644P
FR PIN:5
TO PIN:3
VOC_FADER
K_OUT_L
K_OUT_R
K_IN_R
K_IN_L
LINE_OUT
LINE_IN
VOC_FR
VOC_FL
MIC_OUT
MIC-R
MIC_L
MUL_L
1557
1558
1553
N.C
MIC 2
1552
MIC 1
1551
SM@
WD@
PRE_AMP_OUT
BZX79-C5V6
DETC3
DETC4
AGND
DGND
DVcc
AVcc
FADJ
VREF
OSC
FIFO Memory
DAC
ADC
IV1
IV2
AMP_IN
OUT
IN
IC
DETC1
DETC2
+8.6V
+V
VDD
+4.3V
+11.5V
+5.6V
+5

WD@ -> For version without DIGITAL ECHO

SM@ -> For version with single mic input.

| | |
|---|---|
| MULTIPLEX | 9553, 9554, 9556, 9557, 9558 |
| VOCAL FADER | 9555, 9559, 9560 |

| | |
|---|---|
| 1551 | H 2 |
| 1552 | F 2 |
| 1553 | C 4 |
| 1557 | D 1 |
| 1558 | B 1 |
| 2601 | B 2 |
| 2602 | D 2 |
| 2603 | B 3 |
| 2604 | D 3 |
| 2605 | A 3 |
| 2606 | C 3 |
| 2607 | B 4 |
| 2608 | D 4 |
| 2609 | B 5 |
| 2610 | D 5 |
| 2611 | B 6 |
| 2612 | D 6 |
| 2613 | A 7 |
| 2614 | C 7 |
| 2619 | B 3 |
| 2620 | D 3 |
| 2621 | B 7 |
| 2622 | D 7 |
| 2630 | B10 |
| 2631 | B11 |
| 2632 | B12 |
| 2633 | E 3 |
| 2639 | F14 |
| 2651 | H 3 |
| 2652 | H 4 |
| 2653 | G 5 |
| 2654 | H 5 |
| 2655 | I 4 |
| 2656 | H 6 |
| 2657 | H 6 |
| 2658 | G 4 |
| 2662 | H13 |
| 2663 | H14 |
| 2664 | G14 |
| 2665 | H13 |
| 2666 | G14 |
| 2667 | F13 |
| 2668 | F13 |
| 2669 | F12 |
| 2670 | G12 |
| 2671 | H12 |
| 2672 | H12 |
| 2673 | I12 |
| 2674 | I12 |
| 2675 | F 9 |
| 2676 | G 9 |
| 2677 | I 9 |
| 2681 | I13 |
| 2683 | H 9 |
| 2685 | I 3 |
| 3601 | B 3 |
| 3602 | D 3 |
| 3603 | B 3 |
| 3604 | E 3 |
| 3606 | E 3 |
| 3607 | A 4 |
| 3608 | D 4 |
| 3609 | A 3 |
| 3610 | D 6 |
| 3611 | B 4 |
| 3612 | D 4 |
| 3613 | C 6 |
| 3614 | B 6 |
| 3615 | A 7 |
| 3616 | C 7 |
| 3617 | A 7 |
| 3618 | C 7 |
| 3619 | B 7 |
| 3620 | D 7 |
| 3640 | C 6 |
| 3641 | C 6 |
| 3642 | C 6 |
| 3643 | B11 |
| 3644 | B11 |
| 3645 | A11 |
| 3646 | A12 |
| 3651 | H 3 |
| 3652 | G 3 |
| 3653 | I 4 |
| 3654 | G 5 |
| 3655 | I 5 |
| 3656 | H 6 |
| 3657 | H 4 |
| 3673 | H 6 |
| 3681 | F14 |
| 3682 | F13 |
| 3683 | G13 |
| 3684 | F12 |
| 3686 | H14 |
| 3687 | H13 |
| 3688 | H14 |
| 3689 | H14 |
| 3690 | H13 |
| 3691 | I12 |
| 3692 | G13 |
| 3693 | G12 |
| 3694 | F12 |
| 3695 | I 9 |
| 3697 | I 9 |
| 3698 | H 6 |
| 5651 | G 5 |
| 6601 | B12 |
| 7503 | F12 |
| 7601 | A 4 |
| 7601 | D 4 |
| 7602 | B 7 |
| 7603 | D 7 |
| 7651 | H 6 |
| 7651 | H 5 |
| 9551 | G 2 |
| 9553 | B 5 |
| 9554 | D 5 |
| 9555 | A 4 |
| 9556 | A 4 |
| 9557 | A 5 |
| 9558 | C 6 |
| 9559 | C 5 |
| 9560 | D 5 |
| 9561 | G 7 |
| 9563 | G 5 |

MISCELLANEOUS

| | | |
|---|---|---|
| 1551 | 4822 267 40898 | Mic Socket |
| 1552 | 4822 267 40898 | Mic Socket |
| 1553 | 4822 276 12571 | Vocal Fader Switch |

CAPACITORS

| | | |
|---|---|---|
| 2601 | 4822 124 40242 | 1μF 20% 63V |
| 2602 | 4822 124 40242 | 1μF 20% 63V |
| 2603 | 4822 121 43526 | 47nF 5% 250V |
| 2604 | 4822 121 43526 | 47nF 5% 250V |
| 2605 | 4822 126 12787 | 330pF 10% 50V |
| 2606 | 4822 126 12787 | 330pF 10% 50V |
| 2607 | 4822 122 33519 | 470pF 10% 50V |
| 2608 | 4822 122 33519 | 470pF 10% 50V |
| 2609 | 4822 124 40242 | 1μF 20% 63V |
| 2610 | 4822 124 40242 | 1μF 20% 63V |
| 2611 | 4822 124 40242 | 1μF 20% 63V |
| 2612 | 4822 124 40242 | 1μF 20% 63V |
| 2613 | 4822 124 40242 | 1μF 20% 63V |
| 2614 | 4822 124 40242 | 1μF 20% 63V |
| 2619 | 4822 122 33195 | 100pF 10% 50V |
| 2620 | 4822 122 33195 | 100pF 10% 50V |
| 2621 | 4822 126 12787 | 330pF 10% 50V |
| 2622 | 4822 126 12787 | 330pF 10% 50V |
| 2630 | 4822 124 41584 | 100μF 20% 10V |
| 2631 | 4822 124 80144 | 220μF 20% 25V |
| 2631 | 4822 124 22263 | 220μF 20% 25V |
| 2632 | 4822 124 41584 | 100μF 20% 10V |
| 2633 | 4822 122 33197 | 1nF 10% 50V |
| 2639 | 4822 124 40242 | 1μF 20% 63V |
| 2651 | 4822 124 40242 | 1μF 20% 63V |
| 2652 | 4822 121 51387 | 10nF 20% 16V |
| 2653 | 4822 122 33519 | 470pF 10% 50V |
| 2654 | 4822 122 33195 | 100pF 10% 50V |
| 2655 | 4822 121 42408 | 220nF 5% 63V |
| 2656 | 4822 122 33519 | 470pF 10% 50V |
| 2657 | 4822 124 40242 | 1μF 20% 63V |
| 2658 | 4822 122 33519 | 470pF 10% 50V |
| 2662 | 4822 124 40246 | 4,7μF 20% 63V |
| 2663 | 4822 121 43526 | 47nF 5% 250V |
| 2664 | 4822 121 43526 | 47nF 5% 250V |
| 2665 | 4822 126 12882 | 100nF +80-20% 50V |
| 2666 | 4822 121 51387 | 10nF 20% 16V |
| 2667 | 4822 122 10577 | 3,3nF 10% 16V |
| 2668 | 4822 122 10577 | 3,3nF 10% 16V |
| 2669 | 4822 126 12339 | 2200pF 10% |
| 2670 | 4822 126 12787 | 330pF 10% 50V |
| 2671 | 4822 122 33519 | 470pF 10% 50V |
| 2672 | 4822 122 33519 | 470pF 10% 50V |
| 2673 | 5322 121 42386 | 100nF 5% 63V |
| 2674 | 4822 124 40246 | 4,7μF 20% 63V |
| 2675 | 5322 121 42386 | 100nF 5% 63V |
| 2676 | 4822 124 40246 | 4,7μF 20% 63V |
| 2677 | 4822 124 41579 | 10μF 20% 50V |
| 2681 | 4822 122 33195 | 100pF 10% 50V |
| 2683 | 4822 122 33195 | 100pF 10% 50V |
| 2685 | 4822 121 51387 | 10nF 20% 16V |

RESISTORS

| | | |
|---|---|---|
| 3601 | 4822 116 52257 | 22k 5% 0,5W |
| 3602 | 4822 116 52257 | 22k 5% 0,5W |
| 3603 | 4822 116 83874 | 220k 5% 0,5W |
| 3604 | 4822 116 83874 | 220k 5% 0,5W |
| 3606 | 4822 116 52175 | 100R 5% 0,5W |
| 3607 | 4822 116 52264 | 27k 5% 0,5W |
| 3608 | 4822 116 52264 | 27k 5% 0,5W |
| 3609 | 4822 116 83884 | 47k 5% 0,5W |
| 3610 | 4822 116 83884 | 47k 5% 0,5W |
| 3611 | 4822 116 52303 | 8k2 5% 0,5W |
| 3612 | 4822 116 52303 | 8k2 5% 0,5W |
| 3613 | 4822 116 83884 | 47k 5% 0,5W |
| 3614 | 4822 116 83884 | 47k 5% 0,5W |
| 3615 | 4822 116 52235 | 1M 5% 0,5W |
| 3616 | 4822 116 52235 | 1M 5% 0,5W |
| 3617 | 4822 116 52207 | 1k2 5% 0,5W |
| 3617 | 4822 116 52249 | 1k8 5% 0,5W (DPL version) |
| 3618 | 4822 116 52207 | 1k2 5% 0,5W |
| 3618 | 4822 116 52249 | 1k8 5% 0,5W (DPL version) |
| 3619 | 4822 116 52219 | 330R 5% 0,5W |
| 3619 | 4822 116 83883 | 470R 5% 0,5W (DPL version) |
| 3620 | 4822 116 52219 | 330R 5% 0,5W |
| 3620 | 4822 116 83883 | 470R 5% 0,5W (DPL version) |
| 3640 | 4822 116 83864 | 10k 5% 0,5W |
| 3641 | 4822 116 83884 | 47k 5% 0,5W |
| 3642 | 4822 116 83884 | 47k 5% 0,5W |
| 3643 | 4822 116 52289 | 5k6 5% 0,5W |
| 3644 | 4822 116 52289 | 5k6 5% 0,5W |
| 3645 | 4822 052 10221 ⚠ | 220R 5% 0,33W |
| 3646 | 4822 116 83883 | 470R 5% 0,5W |
| 3651 | 4822 116 52269 | 3k3 5% 0,5W |
| 3652 | 4822 116 52269 | 3k3 5% 0,5W |
| 3653 | 4822 116 52283 | 4k7 5% 0,5W |
| 3654 | 4822 116 52271 | 33k 5% 0,5W |
| 3655 | 4822 116 52207 | 1k2 5% 0,5W |
| 3656 | 4822 116 52303 | 8k2 5% 0,5W |
| 3656 | 4822 116 52264 | 27k 5% 0,5W (DPL version) |
| 3657 | 4822 050 11002 | 1k 1% 0,4W |
| 3673 | 4822 101 21204 | Potm Rotary 20kB |
| 3681 | 4822 116 83864 | 10k 5% 0,5W |
| 3682 | 4822 116 83864 | 10k 5% 0,5W |
| 3683 | 4822 116 83864 | 10k 5% 0,5W |
| 3684 | 4822 116 52291 | 56k 5% 0,5W |
| 3686 | 4822 116 83864 | 10k 5% 0,5W |
| 3687 | 4822 116 83884 | 47k 5% 0,5W |
| 3688 | 4822 116 83864 | 10k 5% 0,5W |
| 3689 | 4822 101 11326 | Potm Rotary 500k |
| 3690 | 4822 116 52234 | 100k 5% 0,5W |
| 3691 | 4822 116 83884 | 47k 5% 0,5W |
| 3692 | 4822 116 52271 | 33k 5% 0,5W |
| 3693 | 4822 116 52271 | 33k 5% 0,5W |
| 3694 | 4822 116 52303 | 8k2 5% 0,5W |
| 3695 | 4822 116 52235 | 1M 5% 0,5W |
| 3697 | 4822 116 83882 | 39k 5% 0,5W |
| 3698 | 4822 116 52243 | 1k5 5% 0,5W |

COILS

| | | |
|---|---|---|
| 5651 | 4822 157 52983 | COIL 22μH |

DIODES

| | | |
|---|---|---|
| 6601 | 4822 130 34173 | BZX79-C5V6 |

TRANSISTORS & INTEGRATED CIRCUITS

| | | |
|---|---|---|
| 7503 | 4822 209 33717 | CXA1644P |
| 7601 | 4822 209 83274 | NJM4560D |
| 7602 | 4822 130 41096 | BC550C |
| 7603 | 4822 130 41096 | BC550C |
| 7651 | 4822 209 83274 | NJM4560D |

NOTE: Only the parts mentioned in this list are normal service spare parts.

# ETF2 TAPE MODULE

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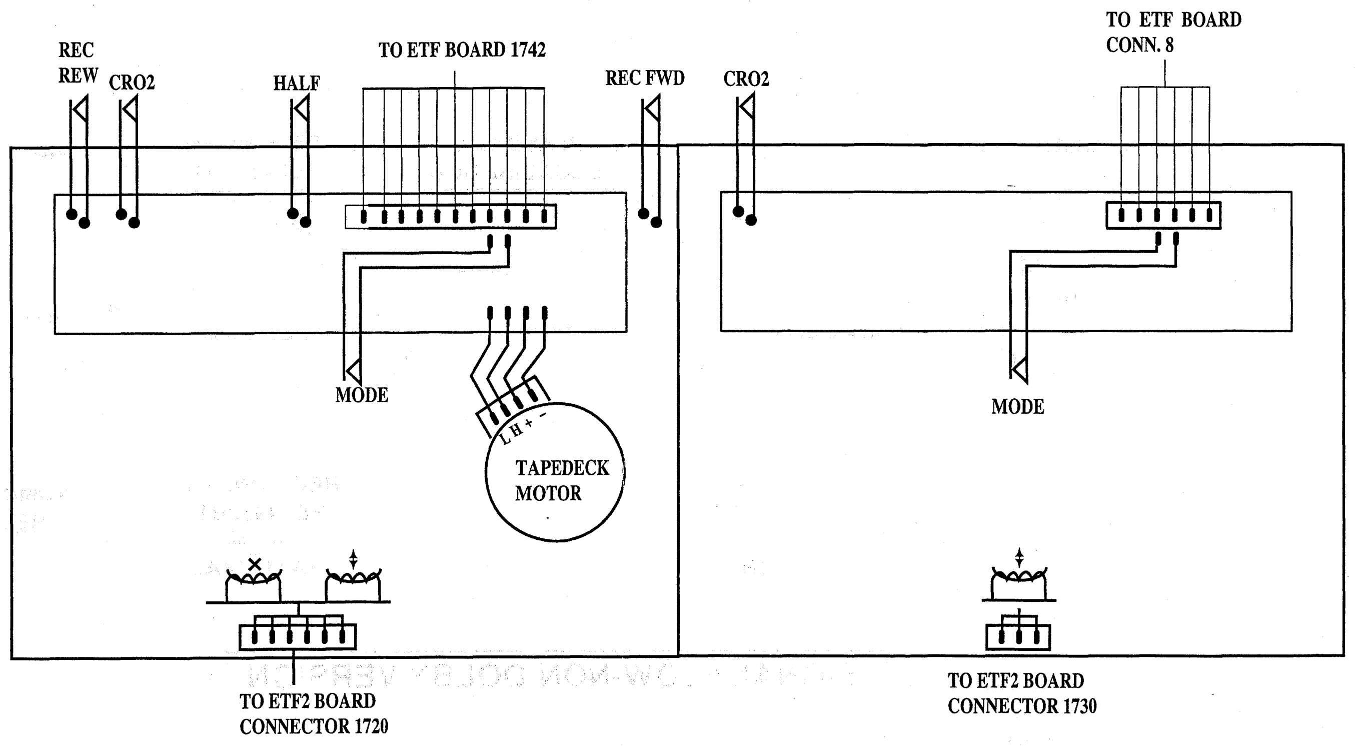
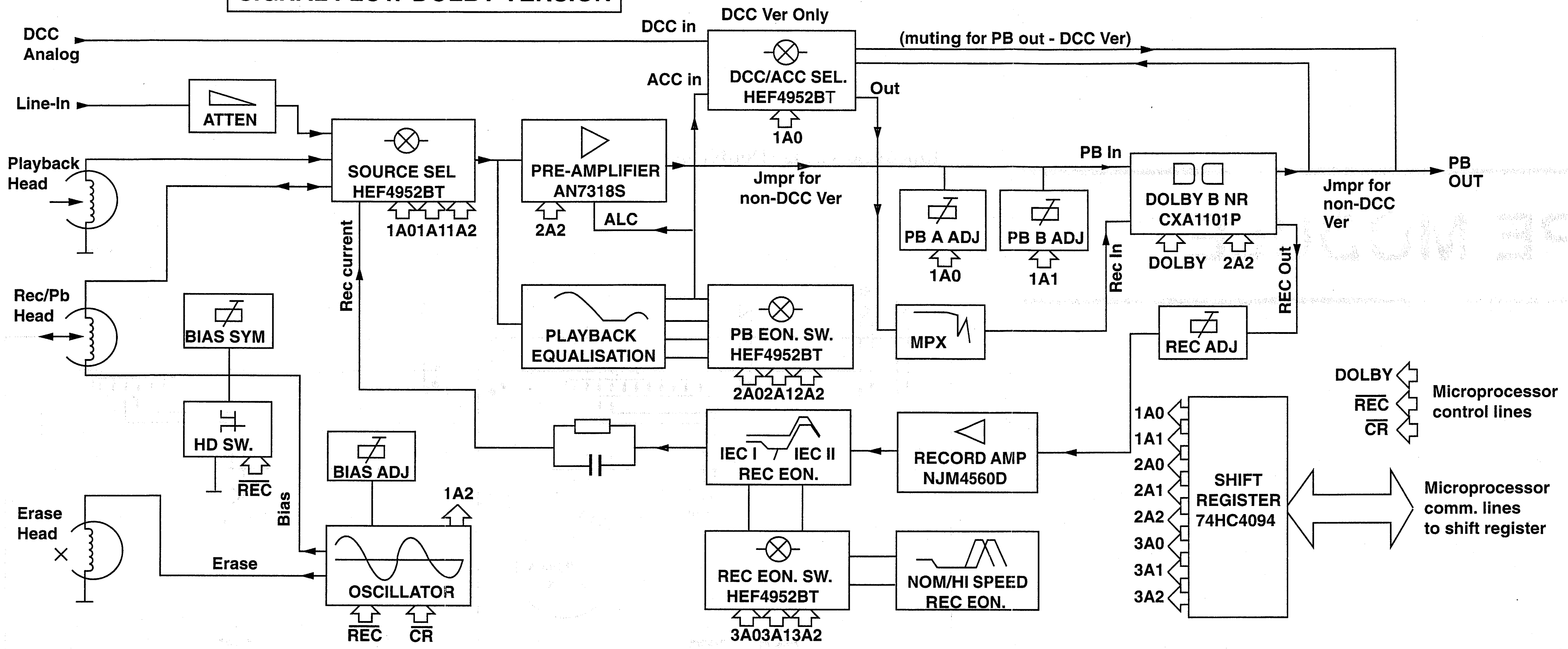
Tape Mechanism Electronics .................................. 9-10
Exploded views & parts list..................................... 9-10
Electrical parts list.................................................... 9-13

## Tapedeck wiring (Double deck)

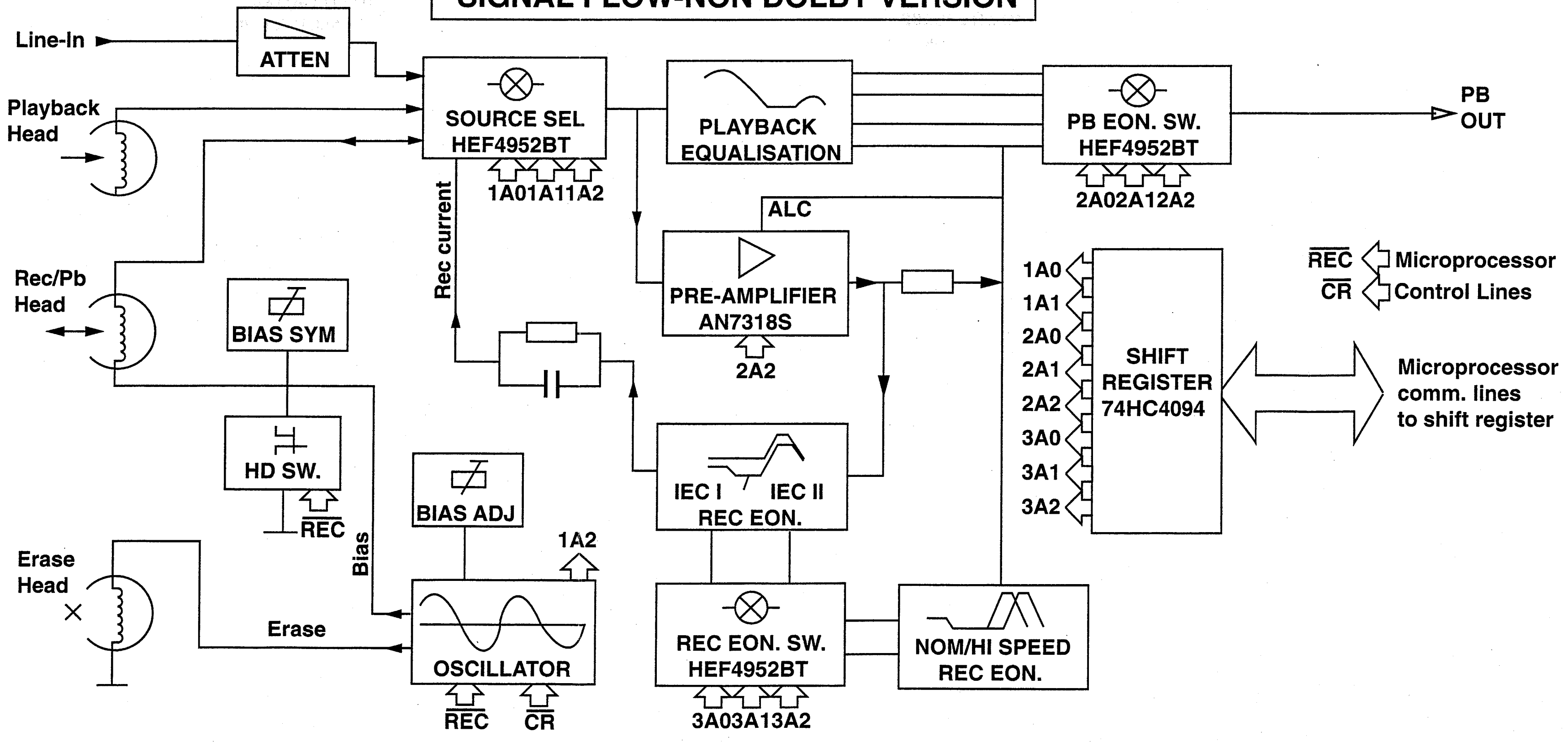

REC
REW
CRO2
HALF
TO ETF BOARD 1742
REC FWD
CRO2
TO ETF BOARD
CONN. 8
MODE
L H + -
TAPEDECK
MOTOR
MODE
TO ETF2 BOARD
CONNECTOR 1720
TO ETF2 BOARD
CONNECTOR 1730

## ETF 2 BLOCK DIAGRAM

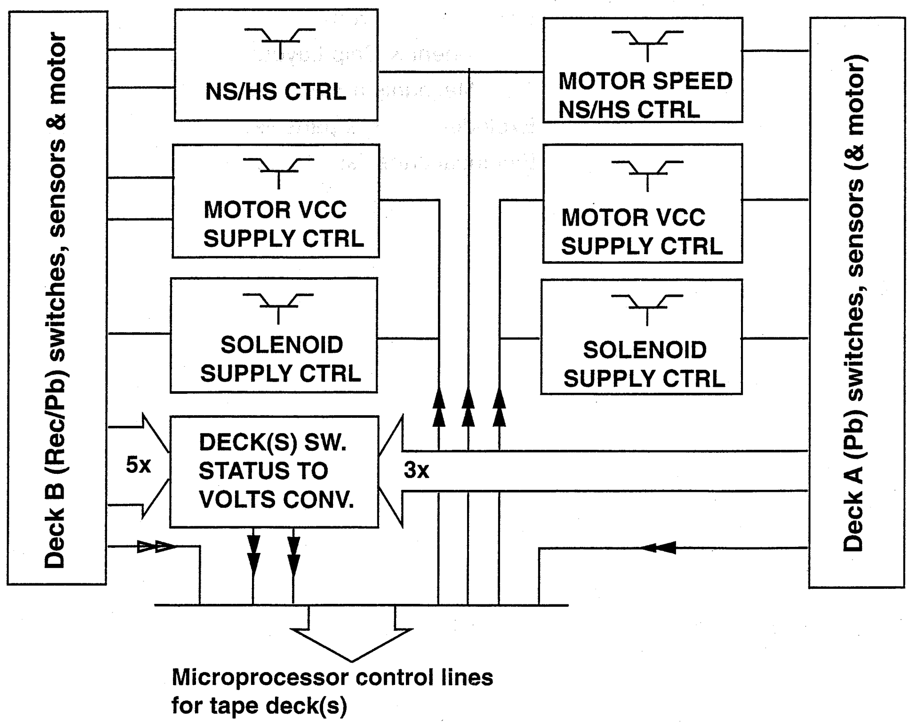
### SIGNAL FLOW-DOLBY VERSION


DCC Analog
Line-In
Playback Head
Rec/Pb Head
Erase Head
ATTEN
SOURCE SEL HEF4952BT
1A0 1A1 1A2
PRE-AMPLIFIER AN7318S
2A2
ALC
DCC in
ACC in
DCC Ver Only
DCC/ACC SEL. HEF4952BT
1A0
Out
(muting for PB out - DCC Ver)
PB In
Jmpr for non-DCC Ver
PB A ADJ
1A0
PB B ADJ
1A1
DOLBY B NR CXA1101P
DOLBY
2A2
Jmpr for non-DCC Ver
PB OUT
Rec In
REC Out
MPX
REC ADJ
Rec current
BIAS SYM
PLAYBACK EQUALISATION
PB EON. SW. HEF4952BT
2A0 2A1 2A2
HD SW.
REC
BIAS ADJ
Bias
1A2
IEC I IEC II REC EON.
RECORD AMP NJM4560D
Erase
OSCILLATOR
REC
CR
REC EON. SW. HEF4952BT
3A0 3A1 3A2
NOM/HI SPEED REC EON.
1A0 1A1 2A0 2A1 2A2 3A0 3A1 3A2
SHIFT REGISTER 74HC4094
DOLBY
REC
CR
Microprocessor control lines
Microprocessor comm. lines to shift register

### SIGNAL FLOW-NON DOLBY VERSION


Line-In
Playback Head
Rec/Pb Head
Erase Head
ATTEN
SOURCE SEL HEF4952BT
1A0 1A1 1A2
PLAYBACK EQUALISATION
PB EON. SW. HEF4952BT
2A0 2A1 2A2
PB OUT
Rec current
ALC
PRE-AMPLIFIER AN7318S
2A2
BIAS SYM
HD SW.
REC
BIAS ADJ
Bias
1A2
IEC I IEC II REC EON.
OSCILLATOR
Erase
REC
CR
REC EON. SW. HEF4952BT
3A0 3A1 3A2
NOM/HI SPEED REC EON.
1A0 1A1 2A0 2A1 2A2 3A0 3A1 3A2
SHIFT REGISTER 74HC4094
REC
CR
Microprocessor Control Lines
Microprocessor comm. lines to shift register

### TAPE DECK(S) INTERFACE PART


Deck B (Rec/Pb) switches, sensors & motor
NS/HS CTRL
MOTOR VCC SUPPLY CTRL
SOLENOID SUPPLY CTRL
DECK(S) SW. STATUS TO VOLTS CONV.
5x
3x
MOTOR SPEED NS/HS CTRL
MOTOR VCC SUPPLY CTRL
SOLENOID SUPPLY CTRL
Deck A (Pb) switches, sensors (& motor)
Microprocessor control lines for tape deck(s)

## GENERAL DESCRIPTION

### FEATURES

The ETF-2 is a family of logic controlled, electronically switched tape function modules. Each module comprises a logic controlled tape deck with attached pcb housing the tape pre-amplifier, recording and switching circuitry, and tape deck interface circuitry.

The following features are available as options:
single / double tape-deck applications
auto-reverse / single way deck options
single / double motor options for double deck
IEC I & IEC II tape types auto selection for playback & recording
Dolby B type Noise Reduction
line-in recording with pilot suppression
tape dubbing at normal & high speed (for double deck applications)
automatic recording level control
software controlled full auto reverse permutations
opto-reflector disc for counter pulses & end-of-tape (EOT) auto-stop
input for DCC deck analog playpack output

### NOTATIONS & ABBREVIATIONS USED IN THIS DOCUMENT

| | |
|---|---|
| Gnd x | Ground x |
| S/A | Sub-assy |
| FE | Ferro (IEC type I) |
| CR | Chrome (IEC type II) |
| NR | Noise Reduction |
| PB | Playback |
| REC | Record |
| NSD | Normal speed dubbing |
| HSD | High speed dubbing |
| DD | Double Deck |
| SD | Single Deck |
| SM | Single Motor |
| DM | Double Motor |
| ND | Non Dolby |
| DB | Dolby B |

| **PC board variations**<br>12NCs (3139 118 ...) | **ND/SD**<br>... 85990 | **ND/DD/FF**<br>... 88910 | **DB/DD/FR**<br>... 88750 | **DB/DD/FF**<br>... 89960 |
|---|---|---|---|---|
| Deck configuration | Single | Double | Double | Double |
| Motor configuration | Single | Single | Single | Single |
| Auto Fe/Cr02 selection | Yes | Yes | Yes | Yes |
| Dolby B | No | No | Yes | Yes |
| 19kHz suppression | No | No | Yes | Yes |
| High speed dubbing | No | Yes | Yes | Yes |
| Audio I/P for DCC sets | No | No | No | No |

Note: ND - Non Dolby, DB - Dolby B
SD - Single Deck, DD - Double Deck
FF - Playback + Rec/Playback
FR - Playback + Auto-reverse Rec/Playback

## CONNECTORS ASSIGNMENTS:

CONNECTOR 1701 — AF SIGNAL & SUPPLY CONNECTIONS

| | | | |
|---|---|---|---|
| ○ | 1 | -CMOS | Negative d.c. supply (-9V) for CMOS ICs |
| ○ | 2 | TAPE-L | Playback output left |
| ○ | 3 | TAPE-R | Playback output right |
| ○ | 4 | +12V | D.C. supply (+12V) for AF electronics |
| ○ | 5 | GND A | AF Ground |
| ○ | 6 | REC-L | Record input left |
| ○ | 7 | REC-R | Record input right |

CONNECTOR 1702 — CONTROL LINES FOR AF ELECTRON ***(For NON-Dolby versions only)***

| | | | | |
|---|---|---|---|---|
| ○ | 1 | STROBE | HEF4094BT shift register Strobe line | |
| ○ | 2 | DATA | HEF4094BT shift register Data line | |
| ○ | 3 | CLK | HEF4094BT shift register Clock line | |
| ○ | 4 | GND P | Control & Oscillator Ground | |
| ○ | 5 | REC' | Record on/off control | (+5V=Pb; 0V=Rec) |
| ○ | 6 | CRO2' | CrO2 tape recording control | (+5V=Fe; 0V=Cr) |

CONNECTOR 1705 — DCC DECK CONNECTORS ***(For versions with inputs for DCC Analog Playback)***

| | | | |
|---|---|---|---|
| ○ | 1 | ACC L | DCC Deck analog playback left |
| ○ | 2 | GND A | AF Ground |
| ○ | 3 | ACC R | DCC Deck analog playback right |

CONNECTOR 1706 — CONTROL LINES FOR AS ELECTRON ***(For versions with Dolby only)***

| | | | | |
|---|---|---|---|---|
| ○ | 1 | STROBE | HEF4094BT shift register Strobe line | |
| ○ | 2 | DATA | HEF4094BT shift register Data line | |
| ○ | 3 | CLK | HEF4094BT shift register Clock line | |
| ○ | 4 | GND P | Control & Oscillator Ground | |
| ○ | 5 | REC' | Record on/off control | (+5V=Pb; 0V=Rec) |
| ○ | 6 | CRO2' | CrO2 tape recording control | (+5V=Fe; 0V=Cr) |
| ○ | 7 | DOLBY' | Dolby NR on/off control (option) | (+5V=off; 0V=On) |

CONNECTOR 1711 — BIAS CURRENT SENSO ***(For Testing purpose only)***

| | | | |
|---|---|---|---|
| ○ | 1 | BIAS L+ | Bias current test connector - left channel |
| ○ | 2 | BIAS L- | Bias current test connector - left channel |
| ○ | 3 | BIAS R+ | Bias current test connector - right channel |
| ○ | 4 | BIAS R- | Bias current test connector - right channel |

CONNECTOR 1720 — DECK B HEADS CONNECTON ***(JQ top-type)***

| | | | |
|---|---|---|---|
| ○ | 1 | B R/P HD L+ | R/P Head left channel positive |
| ○ | 2 | B R/P HD L- | R/P Head left channel negative |
| ○ | 3 | B R/P HD R+ | R/P Head right channel positive |
| ○ | 4 | B R/P HD R- | R/P Head right channel negative |
| ○ | 5 | ERASE HEAD | Erase Head |
| ○ | 6 | GND P | Erase Head ground |

CONNECTOR 1730 DECK A HEAD CONNECTIONS ***(For Double Deck versions only)***

| | | | |
|---|---|---|---|
| ○ | 1 | A PB HD R+ | Pb Head right channel positive |
| ○ | 2 | GND A | Pb Head return ground shield |
| ○ | 3 | A PB HD L+ | Pb Head left channel positive |

### 5.2 TAPE DECK INTERFACES

CONNECTOR 1703 MOTOR SUPPLY LINES ***(PH side-type)***

| | | | |
|---|---|---|---|
| ○ | 1 | +MOTOR | D.C. supply (+12V) for tape deck motor & solenoid |
| ○ | 2 | GND P | Motor Ground |

CONNECTOR 1704 CONTROL LINES FOR TAPE DECK OPERATE ***(PH side-type)***
***(For single Deck versions only)***

| | | | |
|---|---|---|---|
| ○ | 1 | GND | Ground for deck sensing switches network (provision) |
| ○ | 2 | +5V | D.C. supply (+5V) for deck status ADC network (referenced to micro-p) |
| ○ | 3 | AD1 | Deck B sensing switches output voltage |
| ○ | 4 | EOT B | Deck B EOT/counter pulse |
| ○ | 5 | SOLB/MOTB* | Deck B motor/solenoid control (tri-state; see table below) |
| ○ | 6 | AD2 | Deck A sensing switches output voltage |

CONNECTOR 1707 CONTROL LINES FOR TAPE DECK OPERATE ***(PH side-type)***
***(For Double Deck versions only)***

| | | | |
|---|---|---|---|
| ○ | 1 | GND | Ground for deck sensing switches network (provision) |
| ○ | 2 | +5V | D.C. supply (+5V) for deck status ADC network (referenced to micro-p) |
| ○ | 3 | AD1 | Deck B sensing switches output voltage |
| ○ | 4 | EOT B | Deck B EOT/counter pulse |
| ○ | 5 | SOLB/MOTB* | Deck B motor/solenoid control (tri-state; see table below) |
| ○ | 6 | AD2 | Deck A sensing switches output voltage |
| ○ | 7 | EOT A | Deck A EOT/counter pulse |
| ○ | 8 | SOLA/MOTA* | Deck A motor/solenoid control (tri-state; see table) |
| ○ | 9 | AD3 | Deck A sensing switches output voltage |
| ○ | 10 | NS/HS | Normal/high speed toggle (+5V=HS; 0V=NS) |

* motor/solenoid tristate ctrl lines

| | mot | sol |
|---|---|---|
| 0V | on | on |
| Hi-Z | on | off |
| 5V | off | off |

CONNECTOR 1741 DECK B CONTROL INTERFACE
***(For Single Deck versions only)***

| | | | |
|---|---|---|---|
| ○ | 1 | GND | Deck/Motor ground |
| ○ | 2 | MODE | Mode switch (head engagement) |
| ○ | 3 | Vcc | Deck/Motor supply |
| ○ | 4 | SOL B | Solenoid supply |
| ○ | 5 | PHOTO B | Photo sensor output (tape movement indication) |
| ○ | 6 | CrO2 | Chrome tape detection switch |
| ○ | 7 | HALF | Half switch (cassette present detection, provision only) |
| ○ | 8 | REC FWD | Record tab protection status switch (forward) |
| ○ | 9 | REC RVS | Record tab protection status switch (reverse) |

CONNECTOR 1742 DECK B CONTROL INTERFACE
***(For Double Deck versions only)***

| | | | |
|---|---|---|---|
| ○ | 1 | H | H pin for motor |
| ○ | 2 | L | L pin for motor |
| ○ | 3 | GND | Deck/Motor ground |
| ○ | 4 | MODE | Mode switch (head engagement) |
| ○ | 5 | Vcc | Deck/Motor supply |
| ○ | 6 | SOL B | Solenoid supply |
| ○ | 7 | PHOTO B | Photo sensor output (tape movement indication) |
| ○ | 8 | CrO2 | Chrome tape detection switch |
| ○ | 9 | HALF | Half switch (cassette present detection, provision only) |
| ○ | 10 | REC FWD | Record tab protection status switch (forward) |
| ○ | 11 | REC RVS | Record tab protection status switch (reverse) |

CONNECTOR 1743 DECK A CONTROL INTERFAC ***(XH wire-type on dip-mate item 8)***
***(For Double Deck/Single Motor versions only)***

| | | | |
|---|---|---|---|
| ○ | 1 | HALF | Half switch (cassette present detection, provision only) |
| ○ | 2 | CrO2 | Chrome tape detection switch |
| ○ | 3 | PHOTO A | Photo sensor output (tape movement indication) |
| ○ | 4 | SOL A | Solenoid supply |
| ○ | 5 | Vcc | Deck/Motor supply |
| ○ | 6 | MODE | Mode switch (head engagement) |
| ○ | 7 | GND | Deck/Motor ground |

CONNECTOR 1744 DECK A CONTROL INTERFAC ***(XH wire-type on dip-mate item 8 & 9)***
***(For Double Deck/Double Motor versions only)***

| | | | |
|---|---|---|---|
| ○ | 1 | HALF | Half switch (cassette present detection, provisiion only) |
| ○ | 2 | CrO2 | Chrome tape detection switch |
| ○ | 3 | PHOTO A | Photo sensor output (tape movement indication) |
| ○ | 4 | SOL A | Solenoid supply |
| ○ | 5 | Vcc | Deck/Motor supply |
| ○ | 6 | MODE | Mode switch (head engagement) |
| ○ | 7 | GND | Deck/Motor ground |

| | | | |
|---|---|---|---|
| ○ | 1 | L | L pin for motor |
| ○ | 2 | H | H pin for motor |

| SUPPLY | DESCRIPTION | VOLTAGE |
|---|---|---|
| +12V | d.c. supply for AF electronics | +12V |
| +CMOS | d.c. supply for CMOS ICs | -9V |
| +MOTOR | d.c. supply for tape deck motor and solenoid | +12V |
| +5V | d.c. supply for deck status ADC network | +5V |

**General**

| | TEST CASSETTE | RECORDER MODE | MEASURE ON | READ ON | ADJUST | |
|---|---|---|---|---|---|---|
| | | | | | with | to |
| ***ADJUST MOTOR SPEED*** | | | | | | |
| HIGH SPEED | SBC420<br>(4822 397 30071) | DUBBING | 10 or 11<br>LEFT RIGHT | frequency counter | 3682 | 5040Hz±0.5% |
| NORMAL | 3150Hz | PLAY | | | 3684 | 3150Hz±0.5% |
| ***CHECK WOW & FLUTTER (DECK1 AND DECK2)*** | | | | | | |
| WOW FLUTTER | SBC420<br>(4822 397 30071)<br>3150Hz | PLAY | 10 or 11<br>LEFT RIGHT | W&F-meter | check only | ≤0.6 % unwtd. |
| ***ADJUST AZIMUTH (DECK1 AND DECK2)*** | | | | | | |
| NORM. DIRECTION | SBC420<br>(4822 397 30071) | PLAY FWD | 10 or 11<br>LEFT RIGHT | mV-meter | left hand screw | max. output level & left=right |
| REV. DIRECTION | 10kHz | PLAY REV | | | right hand screw | |

**Playback**

| | TEST CASSETTE | RECORDER MODE | MEASURE ON | READ ON | ADJUST | |
|---|---|---|---|---|---|---|
| | | | | | with | to |
| ***ADJUST DOLBY PLAYBACK LEVEL*** | | | | | | |
| DECK1 | DOLBY REF.<br>(4822 397 30271) | PLAY | 10 or 11<br>LEFT RIGHT | mV-meter | 3641(L), 3642(R) | 535mV ±0.5dB |
| DECK2 | 200nWb/m | | | | 3635(L), 3636(R) | |
| ***CHECK PLAYBACK FREQUENCY RESPONSE (DECK1 AND DECK2)*** | | | | | | |
| PB FREQU. RESP. | SBC420<br>(4822 397 30071) | PLAY | 10 or 11<br>LEFT RIGHT | mV-meter | mV-meter | limits see fig.1 |

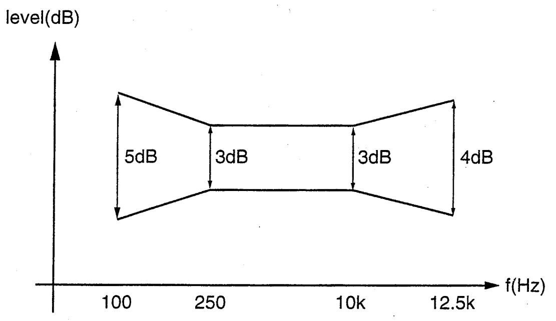


fig. 1

**Recording**

| | TEST CASSETTE | RECORDER MODE | MEASURE ON | READ ON | ADJUST | |
|---|---|---|---|---|---|---|
| | | | | | with | to |
| ***PRE-ADJUST BIAS AND BIAS-SYMMETRY*** | | | | | | |
| $CrO_2$ | $CrO_2$ | RECORD | 12 or 13<br>LEFT RIGHT | mV-meter | 3773 & 3785 | 110mV & left=right |
| FERRO | FERRO | RECORD | | | check only | 71mV ±0.5dB |
| ***CHECK OVERALL FREQUENCY RESPONSE AND DISTORTION*** | | | | | | |
| 37mV at AUX-IN<br>100Hz,250Hz,1kHz<br>10kHz,12.5kHz | $CrO_2$ | RECORD | | | | |
| | RECORDED CASSETTE | PLAY | 10 or 11<br>LEFT RIGHT | mV-meter | check only | limits see fig.2 |
| 100mV at AUX-IN, 1kHz | $CrO_2$ | RECORD | | | | |
| | RECORDED CASSETTE | PLAY | 10 or 11<br>LEFT RIGHT | THD-meter | check only | ≤3% |
| Remark: If high frequencies are not within limits, decrease bias and remeasure.<br>If distortion is too high increase bias and remeasure. | | | | | | |
| ***ADJUST DOLBY RECORD LEVEL*** | | | | | | |
| AUX-IN | $CrO_2$ | RECORD | 10 or 11<br>LEFT RIGHT | mV-meter | LF-generator | 330Hz<br>170mV |
| | $CrO_2$ | RECORD | 12 or 13<br>LEFT RIGHT | mV-meter | 3655 & 3556 | 5mV 1) |
| 1) Remark: Use low pass filter to attenuate the bias component, or short-circuit base of 7783 to ground. | | | | | | |
| ***RECORD LEVEL CHECK*** | | | | | | |
| | RECORDED CASSETTE | PLAY | 10 or 11<br>LEFT RIGHT | mV-meter | check only | 330Hz<br>170mV ±0.5dB |
| Remark: If measured value is out of limit, re-adjust record level and remeasure. | | | | | | |

Note : The adjustment and check table are for all options/variants. For your exact application , please refer to the Options/Variants Table.

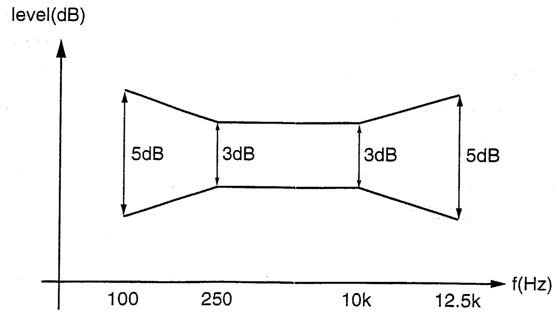
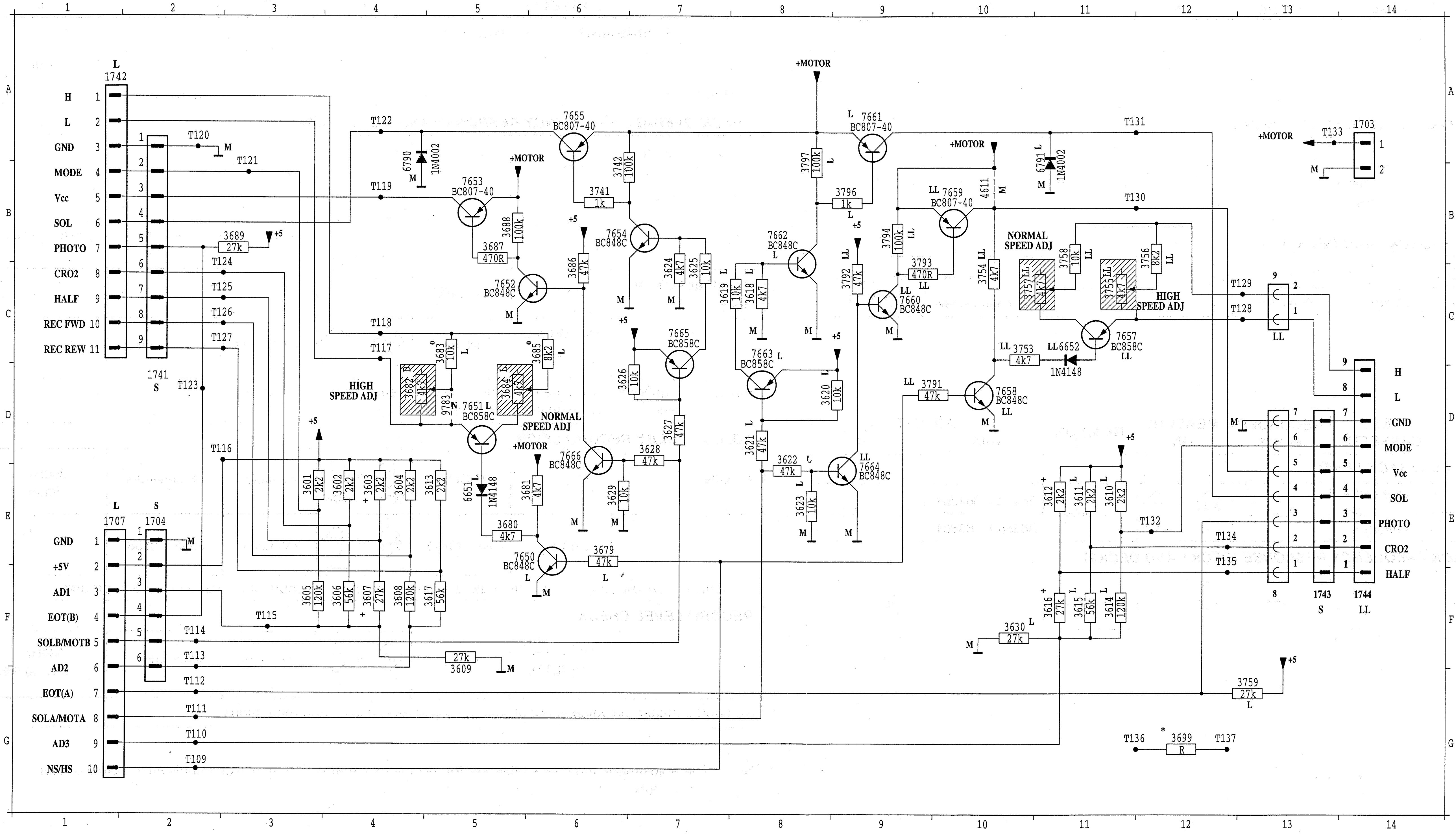


fig. 2

# ETF2 CIRCUIT I



1742
H
L
GND
MODE
Vcc
SOL
PHOTO
CRO2
HALF
REC FWD
REC REW
1741
1707
1704
+5V
AD1
EOT(B)
SOLB/MOTB
AD2
EOT(A)
SOLA/MOTA
AD3
NS/HS
+MOTOR
M
+5
HIGH SPEED ADJ
NORMAL SPEED ADJ
7650 BC848C
7651 BC858C
7652 BC848C
7653 BC807-40
7654 BC848C
7655 BC807-40
7657 BC858C
7658 BC848C
7659 BC807-40
7660 BC848C
7661 BC807-40
7662 BC848C
7663 BC858C
7664 BC848C
7665 BC858C
7666 BC848C
6790 1N4002
6791 1N4002
6651 1N4148
6652 1N4148
1703
1743
1744
3699 R
T136
T137

| | |
|---|---|
| 1703 | A14 |
| 1704 | E 2 |
| 1707 | E 2 |
| 1741 | D 2 |
| 1742 | A 2 |
| 3601 | E 3 |
| 3602 | E 4 |
| 3603 | E 4 |
| 3604 | E 4 |
| 3605 | F 3 |
| 3606 | F 4 |
| 3607 | F 4 |
| 3608 | F 4 |
| 3610 | E11 |
| 3611 | E11 |
| 3612 | E11 |
| 3613 | E 5 |
| 3614 | F11 |
| 3615 | F11 |
| 3616 | F11 |
| 3617 | F 5 |
| 3618 | C 8 |
| 3619 | C 7 |
| 3620 | D 8 |
| 3621 | D 8 |
| 3622 | D 8 |
| 3623 | E 8 |
| 3624 | C 7 |
| 3625 | C 7 |
| 3626 | D 6 |
| 3627 | D 7 |
| 3628 | D 7 |
| 3629 | E 6 |
| 3679 | E 6 |
| 3680 | E 5 |
| 3681 | E 6 |
| 3682 | D 4 |
| 3683 | C 5 |
| 3684 | D 5 |
| 3685 | C 6 |
| 3686 | C 6 |
| 3687 | B 5 |
| 3688 | B 5 |
| 3689 | B 3 |
| 3699 | G12 |
| 3741 | B 6 |
| 3742 | B 6 |
| 3753 | C10 |
| 3754 | C10 |
| 3755 | C11 |
| 3756 | B12 |
| 3757 | C10 |
| 3758 | B11 |
| 3759 | G13 |
| 3791 | D 9 |
| 3792 | C 9 |
| 3793 | C 9 |
| 3794 | B 9 |
| 3796 | B 9 |
| 3797 | A 8 |
| 4611 | B10 |
| 6651 | E 5 |
| 6652 | C11 |
| 6790 | A 4 |
| 6791 | A11 |
| 7650 | E 6 |
| 7651 | D 5 |
| 7652 | C 5 |
| 7653 | B 5 |
| 7654 | B 6 |
| 7655 | A 6 |
| 7657 | C11 |
| 7658 | D10 |
| 7659 | B10 |
| 7660 | C 9 |
| 7661 | A 9 |
| 7662 | B 8 |
| 7663 | C 8 |
| 7664 | E 9 |
| 7665 | C 7 |
| 7666 | D 6 |
| 8 | F13 |
| 9 | C13 |
| 9783 | D 5 |
| T109 | G 2 |
| T110 | G 2 |
| T111 | G 2 |
| T112 | G 2 |
| T113 | F 2 |
| T114 | F 2 |
| T115 | F 3 |
| T116 | D 2 |
| T117 | C 4 |
| T118 | C 4 |
| T119 | B 4 |
| T120 | A 2 |
| T121 | A 3 |
| T122 | A 4 |
| T123 | D 2 |
| T124 | B 2 |
| T125 | C 2 |
| T126 | C 2 |
| T127 | C 2 |
| T128 | C13 |
| T129 | C13 |
| T130 | B11 |
| T131 | A11 |
| T132 | E12 |
| T133 | A13 |
| T134 | E12 |
| T135 | E12 |
| T136 | G11 |
| T137 | G12 |

| | |
|---|---|
| S | Required for sets with Single-Deck only |
| N | Required for sets with Non-Dolby/Double-Deck only |
| D | Required for sets with Dolby/Double-Deck only |
| L | Required for sets with Double-Deck only |
| M | Required for sets with Double-Deck/Single-Motor only |
| LL | Required for sets with Double-Deck/Double-Motor only |
| + | For provision only |

* For Variants detection during PCB testing :

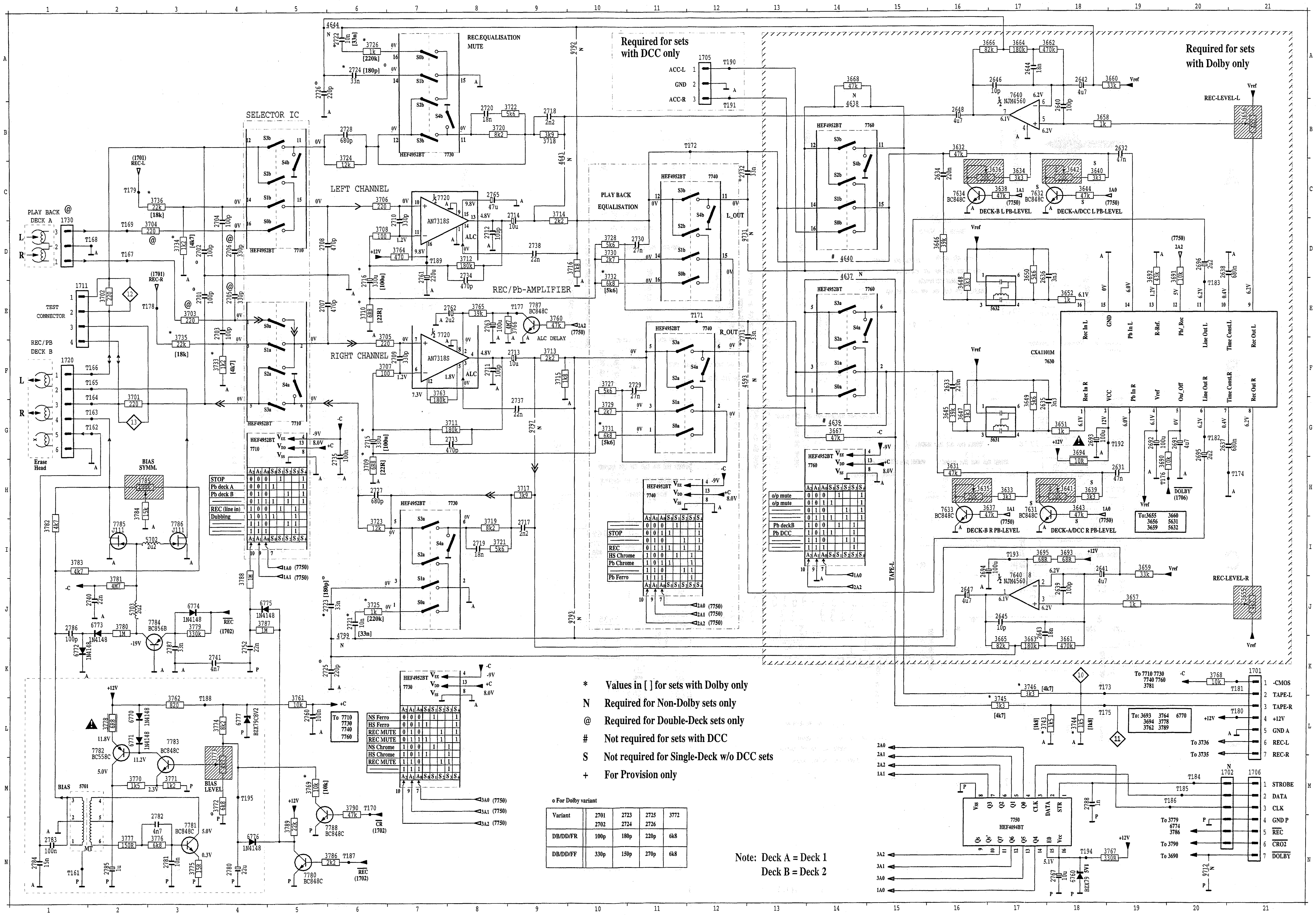
Values for Resistor 3699

| | | |
|---|---|---|
| 1 | ND/SD | 1k |
| 2 | DB/SD | 2k2 |
| 3 | ND/DD/FR | 3k3 |
| 4 | DB/DD/FR | 5k6 |
| 5 | DB/DD/RR | 5k6 |
| 6 | DB/DD/DM | 6k8 |

o For Dolby variant,

| | | |
|---|---|---|
| 3683 | DB/DD/FR | 8k2 |
| | DB/DD/FF | 6k8 |
| 3685 | DB/DD/FR | 10k |

# ETF2 CIRCUIT II


SELECTOR IC
LEFT CHANNEL
RIGHT CHANNEL
REC/Pb-AMPLIFIER
REC.EQUALISATION MUTE
PLAY BACK EQUALISATION
Required for sets with DCC only
Required for sets with Dolby only
PLAY BACK DECK A
REC/PB DECK B
TEST CONNECTOR
Erase Head
BIAS SYMM.
BIAS
BIAS LEVEL
AN7318S
ALC
ALC DELAY
HEF4952BT
HEF4094BT
NJM4560
CXA1101M
DECK-B L PB-LEVEL
DECK-A/DCC L PB-LEVEL
DECK-B R PB-LEVEL
DECK-A/DCC R PB-LEVEL
REC-LEVEL-L
REC-LEVEL-R
L_OUT
R_OUT
TAPE-L
-CMOS
TAPE-L
TAPE-R
+12V
GND A
REC-L
REC-R
STROBE
DATA
CLK
GND P
REC
CRO2
DOLBY
STOP
Pb deck A
Pb deck B
REC (line in)
Dubbing
o/p mute
Pb deckB
Pb DCC
REC
HS Chrome
Pb Chrome
Pb Ferro
NS Ferro
HS Ferro
REC MUTE
NS Chrome

* Values in [ ] for sets with Dolby only

N Required for Non-Dolby sets only

@ Required for Double-Deck sets only

# Not required for sets with DCC

S Not required for Single-Deck w/o DCC sets

+ For Provision only

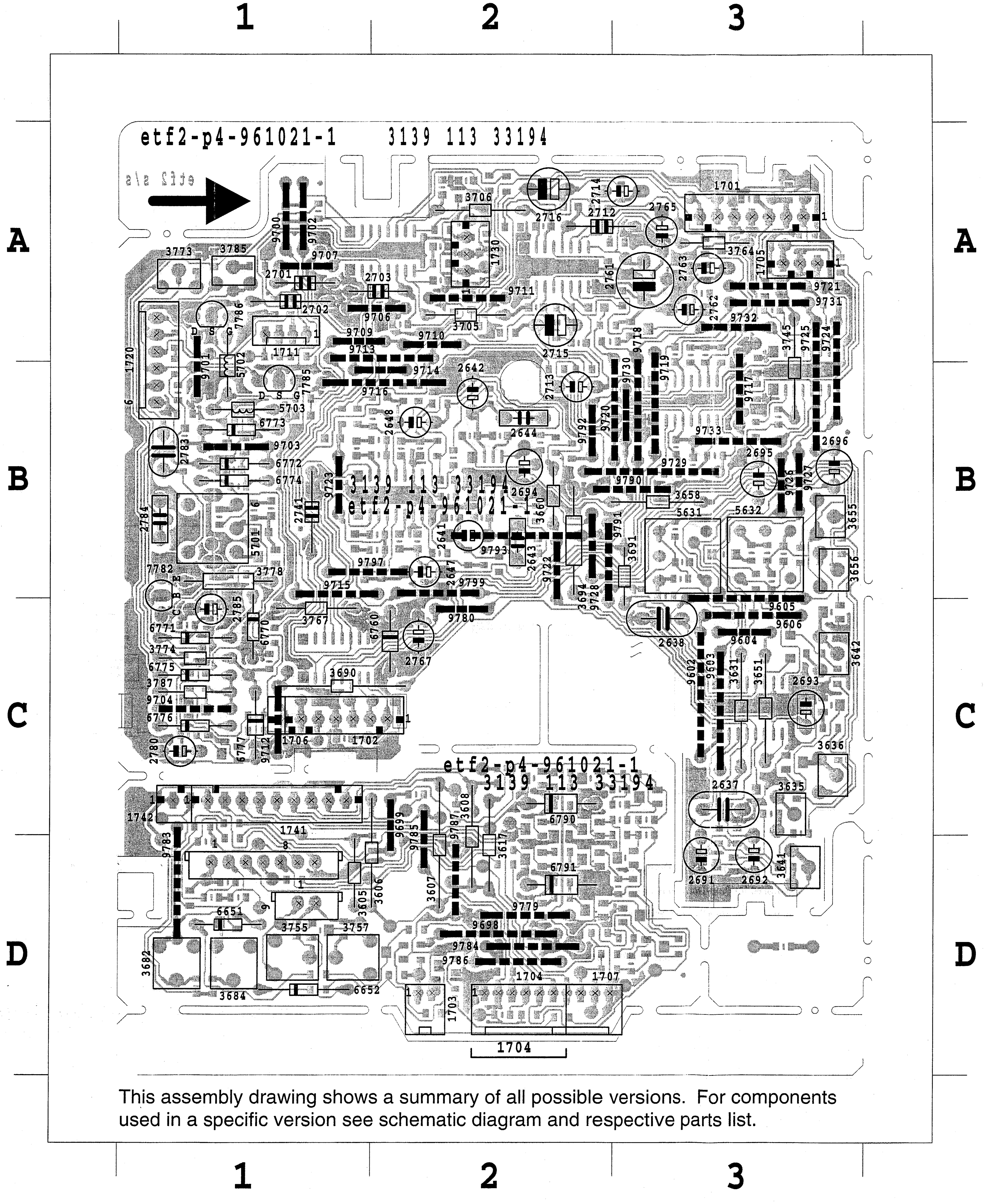
o For Dolby variant

| Variant | 2701<br>2702 | 2723<br>2724 | 2725<br>2726 | 3772 |
|---|---|---|---|---|
| DB/DD/FR | 100p | 180p | 220p | 6k8 |
| DB/DD/FF | 330p | 150p | 270p | 6k8 |

Note: Deck A = Deck 1
Deck B = Deck 2

| | |
|---|---|
| 1701 | K21 |
| 1702 | M20 |
| 1705 | A12 |
| 1706 | M21 |
| 1711 | E 1 |
| 1720 | F 1 |
| 1730 | D 1 |
| 2631 | H19 |
| 2632 | B19 |
| 2633 | F16 |
| 2634 | C16 |
| 2635 | G17 |
| 2636 | D17 |
| 2637 | G20 |
| 2638 | D20 |
| 2639 | J18 |
| 2640 | B18 |
| 2641 | I18 |
| 2642 | A18 |
| 2643 | J17 |
| 2644 | A17 |
| 2645 | J17 |
| 2646 | A17 |
| 2647 | J16 |
| 2648 | B16 |
| 2691 | G20 |
| 2692 | G19 |
| 2693 | G18 |
| 2694 | I16 |
| 2695 | G20 |
| 2696 | D20 |
| 2701 | E 3 |
| 2702 | D 3 |
| 2703 | E 4 |
| 2704 | D 4 |
| 2705 | E 4 |
| 2706 | D 4 |
| 2707 | E 5 |
| 2708 | D 5 |
| 2709 | F 7 |
| 2710 | D 7 |
| 2711 | F 8 |
| 2712 | D 8 |
| 2713 | F 9 |
| 2714 | C 9 |
| 2715 | G 6 |
| 2716 | E 6 |
| 2717 | I 9 |
| 2718 | B 9 |
| 2719 | I 8 |
| 2720 | B 8 |
| 2721 | J 6 |
| 2722 | A 6 |
| 2723 | J 5 |
| 2724 | A 6 |
| 2725 | K 5 |
| 2726 | A 5 |
| 2727 | H 6 |
| 2728 | B 6 |
| 2729 | F11 |
| 2730 | D11 |
| 2731 | E12 |
| 2732 | C12 |
| 2733 | G 8 |
| 2734 | D 8 |
| 2735 | H 6 |
| 2737 | G 9 |
| 2738 | D 9 |
| 2740 | J 2 |
| 2741 | K 4 |
| 2752 | K 4 |
| 2760 | L 5 |
| 2761 | D 7 |
| 2762 | E 8 |
| 2763 | E 8 |
| 2765 | C 8 |
| 2767 | N18 |
| 2780 | N 4 |
| 2781 | N 3 |
| 2782 | N 3 |
| 2783 | N 1 |
| 2784 | N 1 |
| 2785 | N 2 |
| 2786 | J 1 |
| 2787 | K 3 |
| 2788 | M18 |
| 3631 | H16 |
| 3632 | B16 |
| 3633 | H17 |
| 3634 | C17 |
| 3635 | H16 |
| 3636 | C17 |
| 3637 | H17 |
| 3638 | C17 |
| 3639 | H18 |
| 3640 | C18 |
| 3641 | H18 |
| 3642 | C18 |
| 3643 | H18 |
| 3644 | C18 |
| 3645 | G16 |
| 3646 | D16 |
| 3647 | G16 |
| 3648 | E16 |
| 3649 | G17 |
| 3650 | D17 |
| 3651 | G18 |
| 3652 | E18 |
| 3655 | J21 |
| 3656 | B21 |
| 3657 | J19 |
| 3658 | B18 |
| 3659 | I19 |
| 3660 | A19 |
| 3661 | K18 |
| 3662 | A18 |
| 3663 | K17 |
| 3664 | A17 |
| 3665 | K17 |
| 3666 | A17 |
| 3667 | G14 |
| 3668 | A14 |
| 3690 | H19 |
| 3691 | D20 |
| 3692 | D19 |
| 3693 | I18 |
| 3694 | G18 |
| 3695 | I17 |
| 3701 | F 2 |
| 3702 | E 2 |
| 3703 | E 3 |
| 3704 | D 3 |
| 3705 | E 6 |
| 3706 | C 6 |
| 3707 | F 6 |
| 3708 | D 6 |
| 3709 | H 6 |
| 3710 | E 6 |
| 3711 | G 8 |
| 3712 | D 8 |
| 3713 | F 9 |
| 3714 | C 9 |
| 3715 | F 9 |
| 3716 | D10 |
| 3717 | H 9 |
| 3718 | B 9 |
| 3719 | I 8 |
| 3720 | B 8 |
| 3721 | I 8 |
| 3722 | B 9 |
| 3723 | I 6 |
| 3724 | B 6 |
| 3725 | J 6 |
| 3726 | A 6 |
| 3727 | F10 |
| 3728 | D10 |
| 3729 | G10 |
| 3730 | D10 |
| 3731 | G10 |
| 3732 | D10 |
| 3733 | F 4 |
| 3734 | D 3 |
| 3735 | E 3 |
| 3736 | C 3 |
| 3743 | L17 |
| 3744 | L18 |
| 3745 | L17 |
| 3746 | K17 |
| 3760 | E 9 |
| 3761 | L 5 |
| 3762 | L 3 |
| 3763 | F 7 |
| 3764 | D 7 |
| 3765 | E 8 |
| 3766 | E 9 |
| 3767 | N19 |
| 3768 | K20 |
| 3769 | M 5 |
| 3770 | M 2 |
| 3771 | M 3 |
| 3772 | M 4 |
| 3773 | L 4 |
| 3774 | L 4 |
| 3775 | N 3 |
| 3776 | N 3 |
| 3777 | N 2 |
| 3778 | L 2 |
| 3779 | J 3 |
| 3780 | J 2 |
| 3781 | J 2 |
| 3782 | I 1 |
| 3783 | I 1 |
| 3784 | H 2 |
| 3785 | H 2 |
| 3786 | N 6 |
| 3787 | J 4 |
| 3788 | J 4 |
| 3789 | N 5 |
| 3790 | M 6 |
| 4593 | F12 |
| 4637 | E14 |
| 4638 | B14 |
| 4639 | G14 |
| 4640 | D14 |
| 4643 | B 9 |
| 4644 | A 6 |
| 4799 | K 6 |
| 5631 | G17 |
| 5632 | E17 |
| 5701 | M 1 |
| 5702 | I 3 |
| 5703 | J 2 |
| 6760 | N18 |
| 6770 | L 2 |
| 6771 | L 2 |
| 6772 | K 1 |
| 6773 | J 2 |
| 6774 | J 3 |
| 6775 | J 4 |
| 6776 | N 4 |
| 6777 | L 4 |
| 7630 | F18 |
| 7631 | H17 |
| 7632 | C17 |
| 7633 | H16 |
| 7634 | C16 |
| 7640 | J17 |
| 7640 | A17 |
| 7710 | G 5 |
| 7710 | D 5 |
| 7710 | G 4 |
| 7720 | E 7 |
| 7720 | C 7 |
| 7730 | H 7 |
| 7730 | B 7 |
| 7730 | K 7 |
| 7740 | C12 |
| 7740 | H11 |
| 7740 | E12 |
| 7750 | N17 |
| 7760 | E14 |
| 7760 | H13 |
| 7760 | B14 |
| 7780 | N 5 |
| 7781 | N 3 |
| 7782 | L 2 |
| 7783 | L 3 |
| 7784 | J 2 |
| 7785 | I 2 |
| 7786 | I 3 |
| 7787 | E 9 |
| 7788 | N 6 |
| 9712 | N20 |
| 9731 | D12 |
| 9792 | A10 |
| 9793 | J10 |
| 9797 | G 9 |
| T161 | N 1 |
| T162 | G 2 |
| T163 | G 2 |
| T164 | F 2 |
| T165 | F 2 |
| T166 | F 2 |
| T167 | D 2 |
| T168 | D 2 |
| T169 | D 2 |
| T170 | M 6 |
| T171 | E12 |
| T172 | B12 |
| T173 | K18 |
| T174 | H21 |
| T175 | L18 |
| T176 | H19 |
| T177 | E 9 |
| T178 | E 3 |
| T179 | C 2 |
| T180 | L21 |
| T181 | K21 |
| T182 | G20 |
| T183 | E20 |
| T184 | M20 |
| T185 | M20 |
| T186 | M20 |
| T187 | N 6 |
| T188 | L 3 |
| T189 | D 7 |
| T190 | A12 |
| T191 | B12 |
| T192 | G19 |
| T193 | I17 |
| T194 | N18 |
| T195 | M 4 |

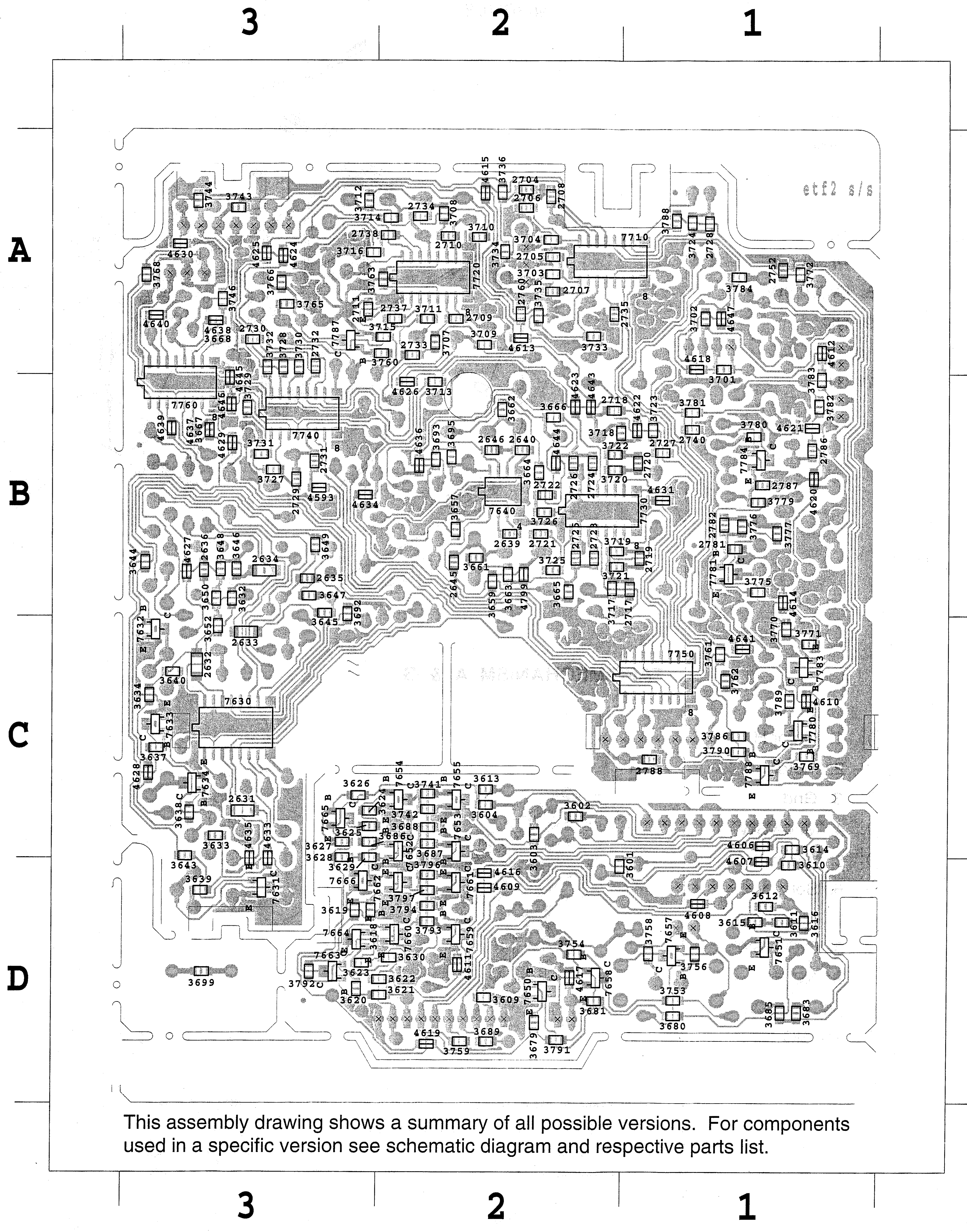
# COMPONENT LAYOUT



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

| | | |
|---|---|---|
| 8 | D | 1 |
| 9 | D | 1 |
| 1701 | A | 3 |
| 1702 | C | 1 |
| 1703 | D | 2 |
| 1704 | D | 2 |
| 1705 | A | 3 |
| 1706 | C | 1 |
| 1707 | D | 2 |
| 1711 | A | 1 |
| 1720 | A | 1 |
| 1730 | A | 2 |
| 1741 | C | 1 |
| 1742 | C | 1 |
| 2637 | C | 3 |
| 2638 | C | 3 |
| 2641 | B | 2 |
| 2642 | B | 2 |
| 2643 | B | 2 |
| 2644 | B | 2 |
| 2647 | B | 2 |
| 2648 | B | 2 |
| 2691 | D | 3 |
| 2692 | D | 3 |
| 2693 | C | 3 |
| 2694 | B | 2 |
| 2695 | B | 3 |
| 2696 | B | 3 |
| 2701 | A | 1 |
| 2702 | A | 1 |
| 2703 | A | 2 |
| 2712 | A | 2 |
| 2713 | B | 2 |
| 2714 | A | 3 |
| 2715 | A | 2 |
| 2716 | A | 2 |
| 2741 | B | 1 |
| 2761 | A | 3 |
| 2762 | A | 3 |
| 2763 | A | 3 |
| 2765 | A | 3 |
| 2767 | C | 2 |
| 2780 | C | 1 |
| 2783 | B | 1 |
| 2784 | B | 1 |
| 2785 | C | 1 |
| 3605 | D | 1 |
| 3606 | D | 2 |
| 3607 | D | 2 |
| 3608 | D | 2 |
| 3617 | D | 2 |
| 3631 | C | 3 |
| 3635 | C | 3 |
| 3636 | C | 3 |
| 3641 | D | 3 |
| 3642 | C | 3 |
| 3651 | C | 3 |
| 3655 | B | 3 |
| 3656 | B | 3 |
| 3658 | B | 3 |
| 3660 | B | 2 |
| 3682 | D | 1 |
| 3684 | D | 1 |
| 3690 | C | 1 |
| 3691 | B | 3 |
| 3694 | B | 2 |
| 3705 | A | 2 |
| 3706 | A | 2 |
| 3745 | B | 3 |
| 3755 | D | 1 |
| 3757 | D | 1 |
| 3764 | A | 3 |
| 3767 | C | 1 |
| 3773 | A | 1 |
| 3774 | C | 1 |
| 3778 | B | 1 |
| 3785 | A | 1 |
| 3787 | C | 1 |
| 5631 | B | 3 |
| 5632 | B | 3 |
| 5701 | B | 1 |
| 5702 | B | 1 |
| 5703 | B | 1 |
| 6651 | D | 1 |
| 6652 | D | 1 |
| 6760 | C | 2 |
| 6770 | C | 1 |
| 6771 | C | 1 |
| 6772 | B | 1 |
| 6773 | B | 1 |
| 6774 | B | 1 |
| 6775 | C | 1 |
| 6776 | C | 1 |
| 6777 | C | 1 |
| 6790 | C | 2 |
| 6791 | D | 2 |
| 7782 | B | 1 |
| 7785 | B | 1 |
| 7786 | A | 1 |
| 9602 | C | 3 |
| 9603 | C | 3 |
| 9604 | C | 3 |
| 9605 | C | 3 |
| 9606 | C | 3 |
| 9698 | D | 2 |
| 9699 | C | 2 |
| 9700 | A | 1 |
| 9701 | B | 1 |
| 9702 | A | 1 |
| 9703 | B | 1 |
| 9704 | C | 1 |
| 9706 | A | 2 |
| 9707 | A | 1 |
| 9709 | A | 1 |
| 9710 | A | 2 |
| 9711 | A | 2 |
| 9712 | C | 1 |
| 9713 | A | 2 |
| 9714 | B | 2 |
| 9715 | B | 1 |
| 9716 | B | 2 |
| 9717 | B | 3 |
| 9718 | B | 3 |
| 9719 | B | 3 |
| 9720 | B | 3 |
| 9721 | A | 3 |
| 9722 | B | 2 |
| 9723 | B | 1 |
| 9724 | B | 3 |
| 9725 | B | 3 |
| 9726 | B | 3 |
| 9727 | B | 3 |
| 9728 | B | 2 |
| 9729 | B | 3 |
| 9730 | B | 3 |
| 9731 | A | 3 |
| 9732 | A | 3 |
| 9733 | B | 3 |
| 9779 | D | 2 |
| 9780 | C | 2 |
| 9783 | D | 1 |
| 9784 | D | 2 |
| 9785 | D | 2 |
| 9786 | D | 2 |
| 9787 | D | 2 |
| 9790 | B | 3 |
| 9791 | B | 2 |
| 9792 | B | 2 |
| 9793 | B | 2 |
| 9797 | B | 1 |
| 9799 | B | 2 |

# CHIP LAYOUT



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

| | | | | |
|---|---|---|---|---|
| 2631 C 3 | 3616 D 1 | 3708 A 2 | 3784 A 1 | 7640 B 2 |
| 2632 C 3 | 3618 D 3 | 3709 A 2 | 3786 C 1 | 7650 D 2 |
| 2633 C 3 | 3619 D 3 | 3710 A 2 | 3788 A 1 | 7651 D 1 |
| 2634 B 3 | 3620 D 3 | 3711 A 2 | 3789 C 1 | 7652 C 2 |
| 2635 B 3 | 3621 D 2 | 3712 A 3 | 3790 C 1 | 7653 C 2 |
| 2636 B 3 | 3622 D 2 | 3713 B 2 | 3791 D 2 | 7654 C 2 |
| 2639 B 2 | 3623 D 3 | 3714 A 2 | 3792 D 3 | 7655 C 2 |
| 2640 B 2 | 3624 C 3 | 3715 A 2 | 3793 D 2 | 7657 D 1 |
| 2645 B 2 | 3625 C 3 | 3716 A 3 | 3794 D 2 | 7658 D 2 |
| 2646 B 2 | 3626 C 3 | 3717 B 2 | 3796 D 2 | 7659 D 2 |
| 2704 A 2 | 3627 C 3 | 3718 B 2 | 3797 D 2 | 7660 D 2 |
| 2705 A 2 | 3628 D 3 | 3719 B 2 | 4593 B 3 | 7661 D 2 |
| 2706 A 2 | 3629 D 3 | 3720 B 2 | 4606 C 1 | 7662 D 2 |
| 2707 A 2 | 3630 D 2 | 3721 B 2 | 4607 D 1 | 7663 D 3 |
| 2708 A 2 | 3632 B 3 | 3722 B 2 | 4608 D 1 | 7664 D 3 |
| 2709 A 2 | 3633 C 3 | 3723 B 1 | 4609 D 2 | 7665 C 3 |
| 2710 A 2 | 3634 C 3 | 3724 A 1 | 4610 C 1 | 7666 D 3 |
| 2711 A 3 | 3637 C 3 | 3725 B 2 | 4611 D 2 | 7710 A 2 |
| 2717 B 1 | 3638 C 3 | 3726 B 2 | 4612 A 1 | 7720 A 2 |
| 2718 B 2 | 3639 D 3 | 3727 B 3 | 4613 A 2 | 7730 B 2 |
| 2719 B 1 | 3640 C 3 | 3728 A 3 | 4614 B 1 | 7740 B 3 |
| 2720 B 1 | 3643 C 3 | 3729 B 3 | 4615 A 2 | 7750 C 1 |
| 2721 B 2 | 3644 B 3 | 3730 A 3 | 4616 D 2 | 7760 B 3 |
| 2722 B 2 | 3645 B 3 | 3731 B 3 | 4617 D 2 | 7780 C 1 |
| 2723 B 2 | 3646 B 3 | 3732 A 3 | 4618 A 1 | 7781 B 1 |
| 2724 B 2 | 3647 B 3 | 3733 A 2 | 4619 D 2 | 7783 C 1 |
| 2725 B 2 | 3648 B 3 | 3734 A 2 | 4620 B 1 | 7784 B 1 |
| 2726 B 2 | 3649 B 3 | 3735 A 2 | 4621 B 1 | 7787 A 3 |
| 2727 B 1 | 3650 B 3 | 3736 A 2 | 4622 B 1 | 7788 C 1 |
| 2728 A 1 | 3652 C 3 | 3741 C 2 | 4623 B 2 | |
| 2729 B 3 | 3657 B 2 | 3742 C 2 | 4624 A 3 | |
| 2730 A 3 | 3659 B 2 | 3743 A 3 | 4625 A 3 | |
| 2731 B 3 | 3661 B 2 | 3744 A 3 | 4626 B 2 | |
| 2732 A 3 | 3662 B 2 | 3746 A 3 | 4627 B 3 | |
| 2733 A 2 | 3663 B 2 | 3753 D 1 | 4628 C 3 | |
| 2734 A 2 | 3664 B 2 | 3754 D 2 | 4629 B 3 | |
| 2735 A 2 | 3665 B 2 | 3756 D 1 | 4630 A 3 | |
| 2737 A 2 | 3666 B 2 | 3758 D 1 | 4631 B 1 | |
| 2738 A 2 | 3667 B 3 | 3759 D 2 | 4633 D 3 | |
| 2740 B 1 | 3668 A 3 | 3760 A 2 | 4634 B 3 | |
| 2752 A 1 | 3679 D 2 | 3761 C 1 | 4635 D 3 | |
| 2760 A 2 | 3680 D 1 | 3762 C 1 | 4636 B 2 | |
| 2781 B 1 | 3681 D 2 | 3763 A 2 | 4637 B 3 | |
| 2782 B 1 | 3683 D 1 | 3765 A 3 | 4638 A 3 | |
| 2786 B 1 | 3685 D 1 | 3766 A 3 | 4639 B 3 | |
| 2787 B 1 | 3686 C 3 | 3768 A 3 | 4640 A 3 | |
| 2788 C 1 | 3687 C 2 | 3769 C 1 | 4641 C 1 | |
| 3601 D 2 | 3688 C 2 | 3770 C 1 | 4643 B 2 | |
| 3602 C 2 | 3689 D 2 | 3771 C 1 | 4644 B 2 | |
| 3603 C 2 | 3692 B 3 | 3772 A 1 | 4645 B 3 | |
| 3604 C 2 | 3693 B 2 | 3775 B 1 | 4646 B 3 | |
| 3609 D 2 | 3695 B 2 | 3776 B 1 | 4647 A 1 | |
| 3610 D 1 | 3699 D 3 | 3777 B 1 | 4799 B 2 | |
| 3611 D 1 | 3701 A 1 | 3779 B 1 | 7630 C 3 | |
| 3612 D 1 | 3702 A 1 | 3780 B 1 | 7631 D 3 | |
| 3613 C 2 | 3703 A 2 | 3781 B 1 | 7632 C 3 | |
| 3614 C 1 | 3704 A 2 | 3782 B 1 | 7633 C 3 | |
| 3615 D 1 | 3707 A 2 | 3783 B 1 | 7634 C 3 | |

## TAPE MECHANISM A ELECTRONICS

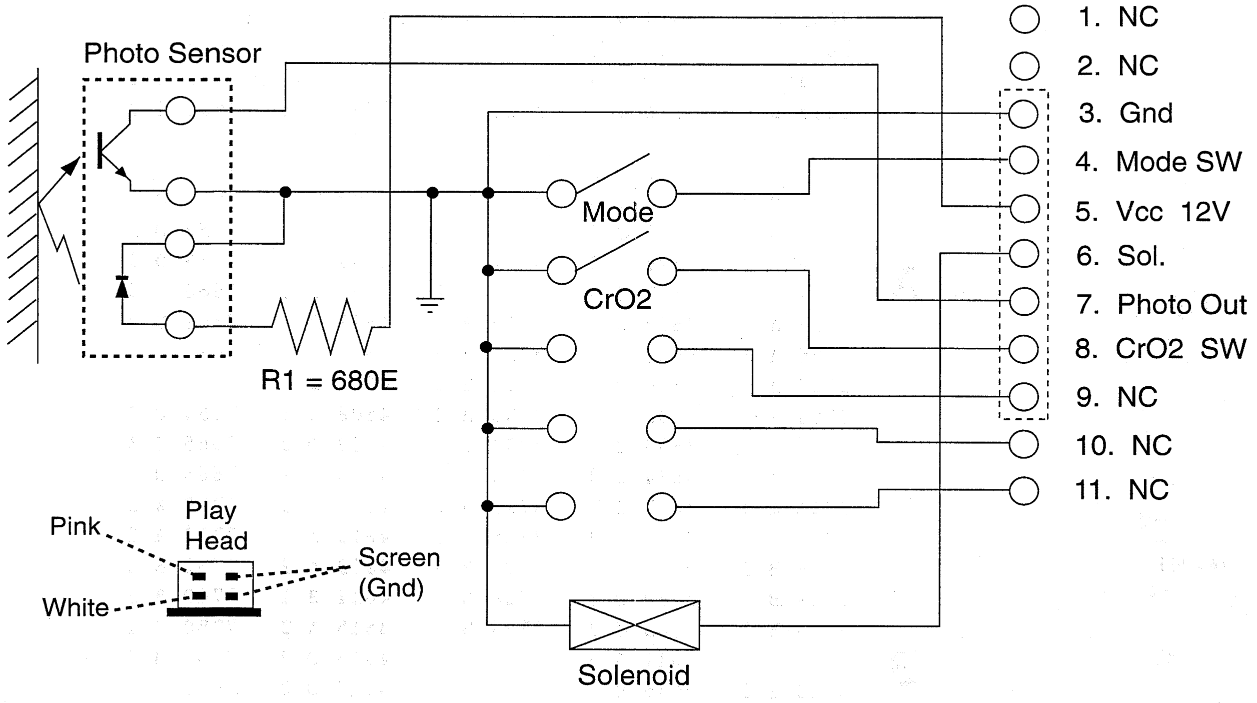
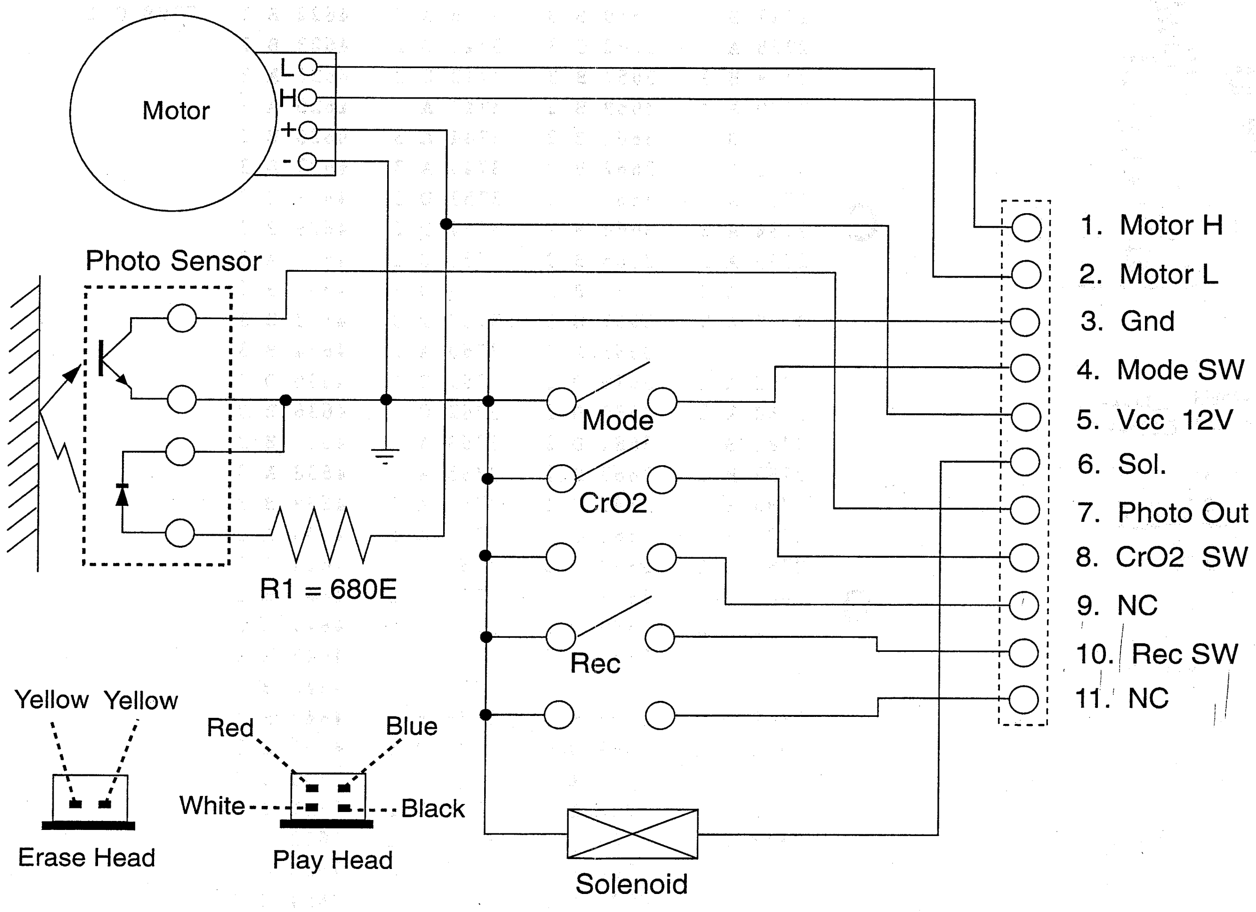
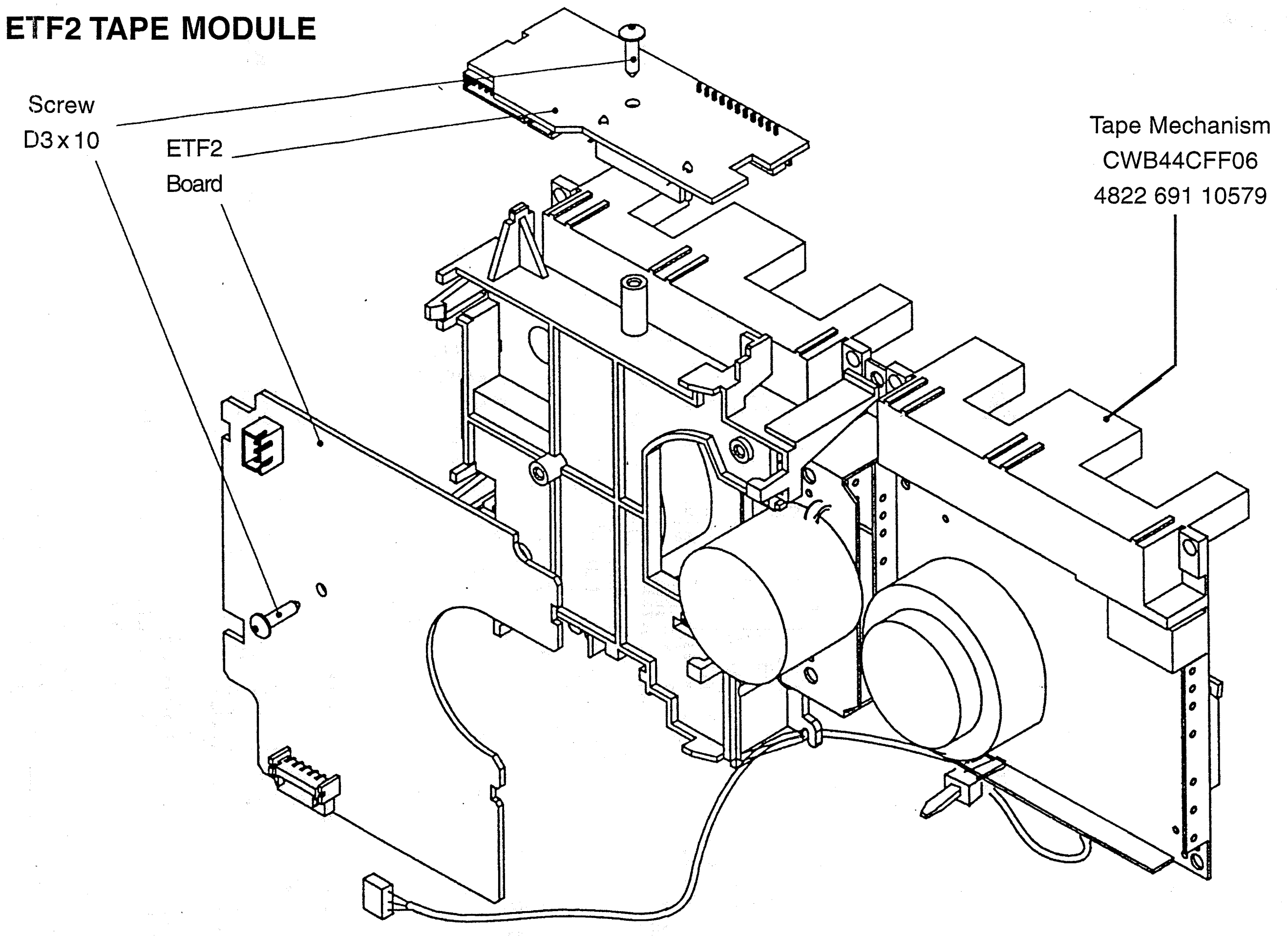


Photo Sensor
R1 = 680E
Mode
CrO2
1. NC
2. NC
3. Gnd
4. Mode SW
5. Vcc 12V
6. Sol.
7. Photo Out
8. CrO2 SW
9. NC
10. NC
11. NC
Pink
Play Head
White
Screen (Gnd)
Solenoid

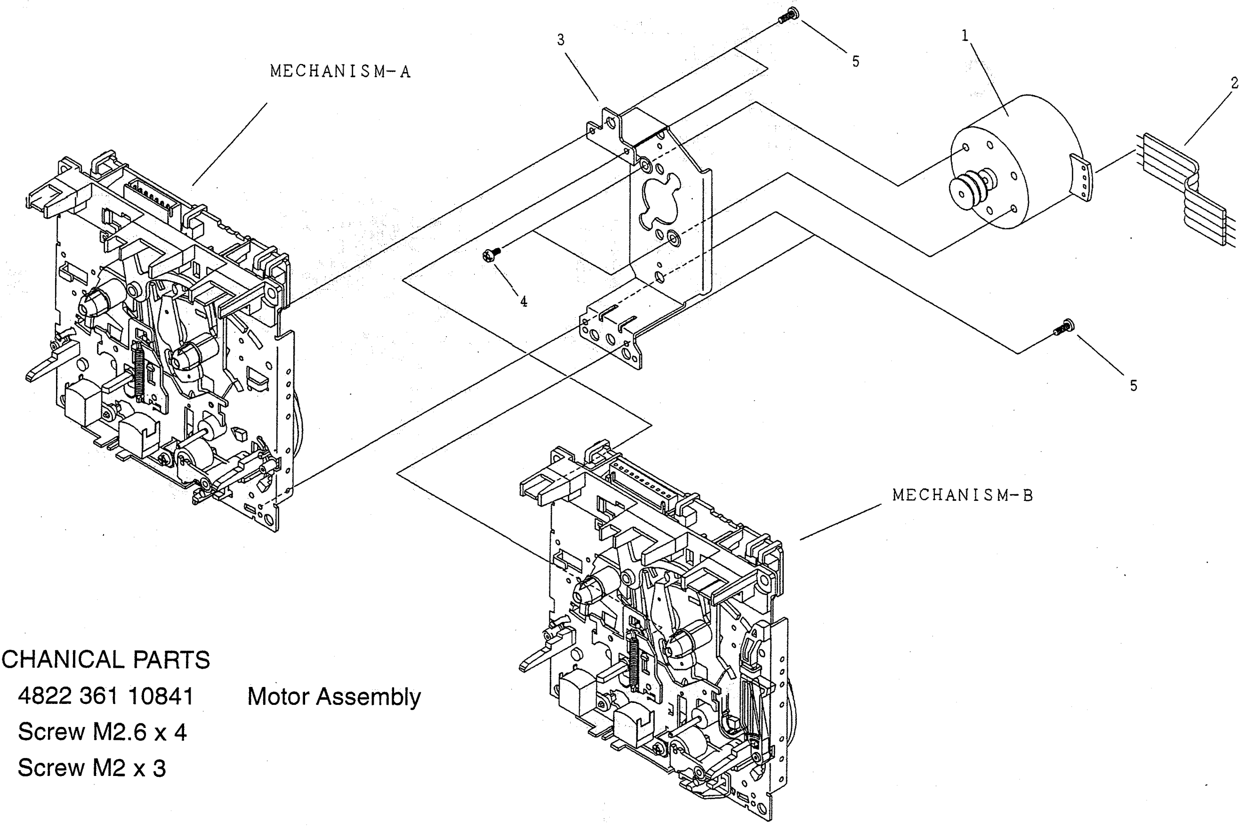
## TAPE MECHANISM B ELECTRONICS


Motor
L
H
+
-
Photo Sensor
R1 = 680E
Mode
CrO2
Rec
1. Motor H
2. Motor L
3. Gnd
4. Mode SW
5. Vcc 12V
6. Sol.
7. Photo Out
8. CrO2 SW
9. NC
10. Rec SW
11. NC
Yellow Yellow
Erase Head
Red
Blue
White
Black
Play Head
Solenoid

## ETF2 TAPE MODULE


Screw
D3x10
ETF2
Board
Tape Mechanism
CWB44CFF06
4822 691 10579

## TAPE MECHANISM A & B

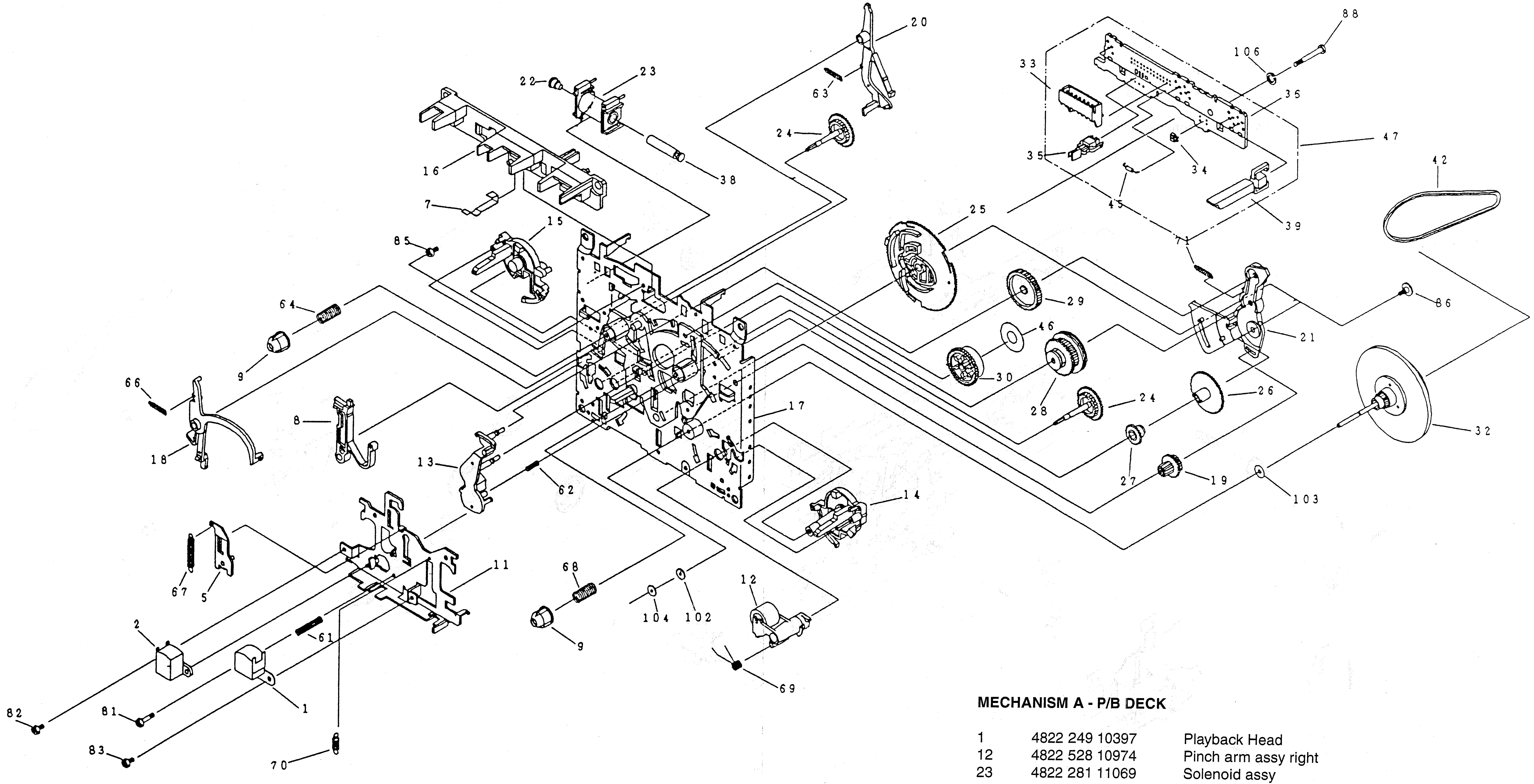

MECHANISM-A
MECHANISM-B
1
2
3
4
5
5

MECHANICAL PARTS

| | | |
|---|---|---|
| 1 | 4822 361 10841 | Motor Assembly |
| 4 | Screw M2.6 x 4 | |
| 5 | Screw M2 x 3 | |

NOTE: Only the parts mentioned in this list are normal service spare parts.

## PLAYBACK MECHANISM A


20
88
22
23
106
33
63
36
24
47
16
38
35
34
42
45
7
25
39
15
85
71
29
86
64
46
21
66
9
30
24
26
17
28
8
32
18
13
27
19
62
103
14
11
68
12
67
5
104
102
2
61
9
1
69
82
81
83
70

### MECHANISM A - P/B DECK

| | | |
|---|---|---|
| 1 | 4822 249 10397 | Playback Head |
| 12 | 4822 528 10974 | Pinch arm assy right |
| 23 | 4822 281 11069 | Solenoid assy |
| 35 | 4822 277 11531 | Mode Switch |
| 39 | 4822 276 13704 | Leaf Switch |
| 42 | 4822 358 10168 | Belt |

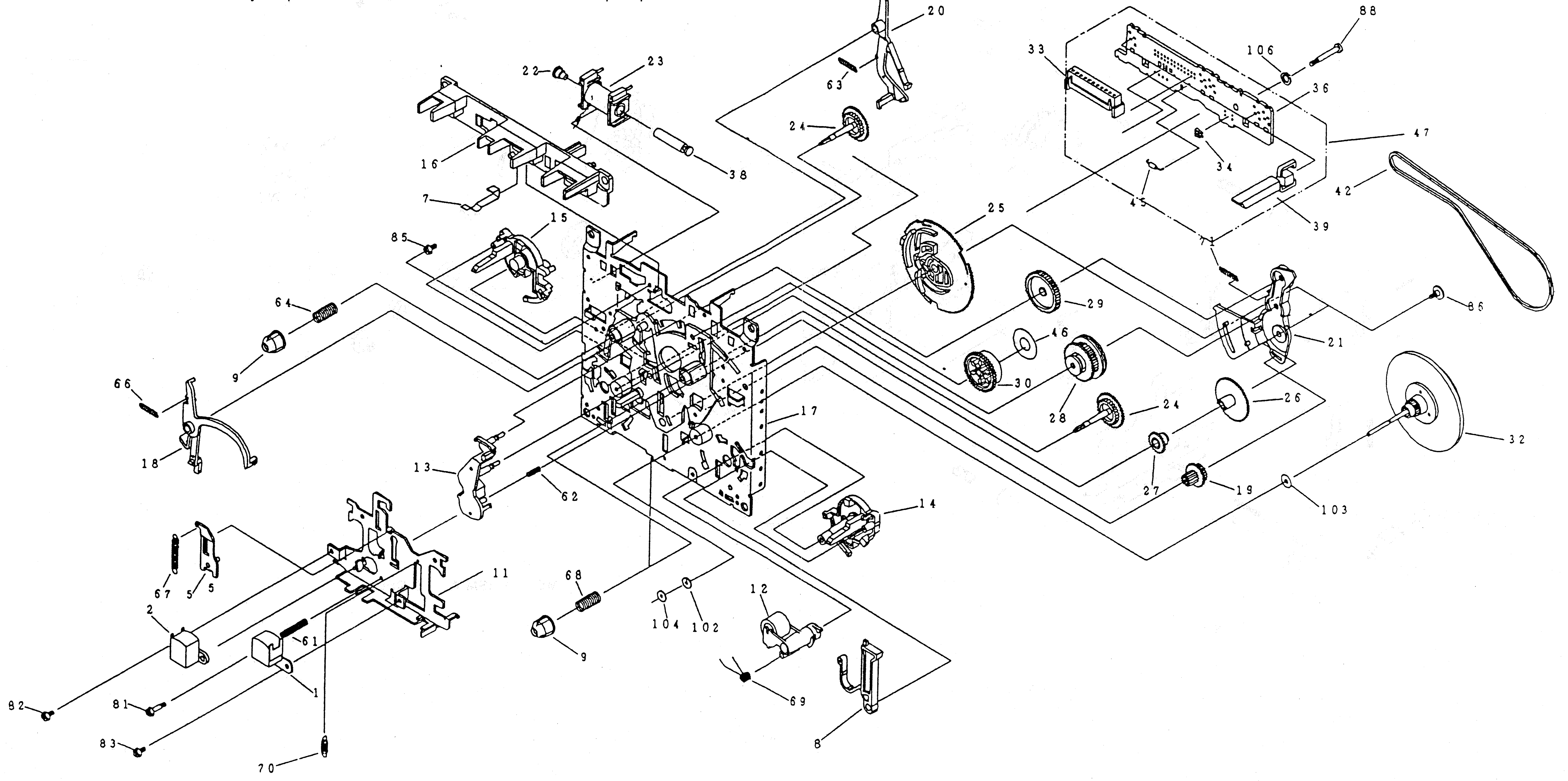
Note: Only the parts mentioned in this list are normal service spare parts.

## REC/PLAYBACK MECHANISM B

### MECHANISM B REC/PB DECK

| | | |
|---|---|---|
| 1 | 4822 249 10526 | REC/PB Head |
| 10 | 4822 528 10975 | Pinch arm assy left |
| 12 | 4822 528 10974 | Pinch arm assy right |
| 23 | 4822 281 11069 | Solenoid assy |
| 35 | 4822 277 11531 | Mode Switch |
| 39 | 4822 276 13704 | Leaf Switch |
| 42 | 4822 358 10169 | Belt |

Note: Only the parts mentioned in this list are normal service spare parts.


20
88
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14
11
67
5
68
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2
104
102
61
9
82
81
1
69
83
8
70

## CASSETTE BOARD PARTLIST

### CAPACITOR

| | | |
|---|---|---|
| 2701 | 4822 122 33195 | 100pF 10% 50V (FW363) |
| 2701 | 4822 126 12787 | 220PF 10% 50V |
| 2702 | 4822 126 12787 | 330PF 10% 50V |
| 2702 | 4822 122 33195 | 100pF 10% 50V |
| 2703 | 4822 122 33195 | 100pF 10% 50V |
| 2704 | 5322 122 31863 | 330pF 5% 50V |
| 2705 | 5322 122 31863 | 330pF 5% 50V |
| 2706 | 5322 122 32531 | 100pF 5% 50V |
| 2707 | 5322 122 34099 | 470pF 10% 63V |
| 2708 | 5322 122 34099 | 470pF 10% 63V |
| 2709 | 5322 122 31863 | 330pF 5% 50V |
| 2710 | 5322 122 31863 | 330pF 5% 50V |
| 2711 | 5322 122 32531 | 100pF 5% 50V |
| 2712 | 4822 122 33195 | 100pF 10% 50V |
| 2713 | 4822 124 41579 | 10µF 20% 50V |
| 2714 | 4822 124 41579 | 10µF 20% 50V |
| 2715 | 4822 124 41584 | 100µF 20% 10V<br>(For -/22 & -/25) |
| 2715 | 4822 124 40849 | 330µF 20% 16V |
| 2716 | 4822 124 41584 | 100µF 20% 10V<br>(For -/22 & -/25) |
| 2716 | 4822 124 40849 | 330µF 20% 16V |
| 2717 | 4822 122 33175 | 2.2nF 20% 50V |
| 2718 | 4822 122 33175 | 2.2nF 20% 50V |
| 2719 | 4822 122 33893 | 18nF 10% 63V |
| 2720 | 4822 122 33893 | 18nF 10% 63V |
| 2721 | 4822 122 33177 | 10nF 20% 50V |
| 2722 | 4822 122 33177 | 10nF 20% 50V |
| 2723 | 5322 122 33538 | 150pF 5% 63V (FW373) |
| 2723 | 4822 122 33342 | 33nF 10% 63V (FW363) |
| 2724 | 5322 122 33538 | 150pF 5% 63V (FW373) |
| 2724 | 4822 122 33342 | 33nF 10% 63V (FW363) |
| 2725 | 5322 126 10794 | 220pF 5% 63V |
| 2726 | 5322 126 10794 | 220pF 5%63V |
| 2727 | 4822 122 32535 | 680pF 10% 63V |
| 2728 | 4822 122 32535 | 680pF 10% 63V |
| 2729 | 4822 122 32541 | 27nF 10% 63V |
| 2730 | 4822 122 32541 | 27nF 10% 63V |
| 2733 | 5322 122 34099 | 470pF 5% 50V |
| 2734 | 5322 122 31863 | 330pF 5% 50V |
| 2735 | 4822 126 10002 | 100nF 20% 25V |
| 2737 | 5322 122 32654 | 22nF 10% 63V |

### CAPACITORS

| | | |
|---|---|---|
| 2738 | 5322 122 32654 | 22nF 10% 63V |
| 2740 | 5322 122 32654 | 22nF 10% 63V |
| 2741 | 4822 126 11714 | 4.7nF 20% |
| 2752 | 5322 122 32654 | 22nF 10% 63V |
| 2760 | 4822 126 10002 | 100nF 20% 25V |
| 2761 | 4822 124 22263 | 220µF 20% 25V |
| 2762 | 4822 124 41576 | 2.2µF 20% 50V |
| 2763 | 4822 124 41584 | 100µF 20% 10V |
| 2765 | 4822 124 40433 | 47µF 20% 25V |
| 2767 | 4822 124 41579 | 10µF 20% 50V |
| 2780 | 4822 124 41596 | 22µF 20% 50V |
| 2781 | 4822 122 33177 | 10nF 20% 50V |
| 2782 | 5322 126 10223 | 4.7nF 10% 63V |
| 2783 | 5322 121 42386 | 100nF 5% 63V |
| 2784 | 4822 121 41856 | 22nF 5% 250V |
| 2785 | 4822 124 40242 | 1µF 20% 63V |
| 2786 | 5322 122 32531 | 100pF 5% 50V |
| 2787 | 4822 122 33342 | 33nF 10% 63V |
| 2788 | 5322 122 34123 | 1nF 10% 50V |

### RESISTORS

| | | |
|---|---|---|
| 3601 | 4822 117 11449 | 2k2 1% 0.1W |
| 3602 | 4822 117 11449 | 2k2 1% 0.1W |
| 3604 | 4822 117 11449 | 2k2 1% 0.1W |
| 3605 | 4822 116 52239 | 120k 5% 0.5W |
| 3606 | 4822 116 52291 | 56k 5% 0.5W |
| 3608 | 4822 116 52239 | 120k 5% 0.5W |
| 3609 | 4822 051 20273 | 27k 5% 0.1W |
| 3610 | 4822 117 11449 | 2k2 1% 0.1W |
| 3611 | 4822 117 11449 | 2k2 1% 0.1W |
| 3613 | 4822 117 11449 | 2k2 1% 0.1W |
| 3614 | 4822 051 20124 | 120k 5% 0.1W |
| 3615 | 4822 051 20563 | 56k 5% 0.1W |
| 3617 | 4822 116 52291 | 56k 5% 0.5W |
| 3618 | 4822 051 20472 | 4k7 5% 0.1W |
| 3619 | 4822 051 20103 | 10k 5% 0.1W |
| 3620 | 4822 051 20103 | 10k 5% 0.1W |
| 3621 | 4822 051 20473 | 47k 5% 0.1W |
| 3622 | 4822 051 20473 | 47k 5% 0.1W |
| 3623 | 4822 051 20103 | 10k 5% 0.1W |
| 3624 | 4822 051 20472 | 4k7 5% 0.1W |

## CASSETTE BOARD PARTLIST

### RESISTORS

| | | |
|---|---|---|
| 3625 | 4822 051 20103 | 10k 5% 0.1W |
| 3626 | 4822 051 20103 | 10k 5% 0.1W |
| 3627 | 4822 051 20473 | 47k 5% 0.1W |
| 3628 | 4822 051 20473 | 47k 5% 0.1W |
| 3629 | 4822 051 20103 | 10k 5% 0.1W |
| 3630 | 4822 051 20273 | 27k 5% 0.1W |
| 3679 | 4822 051 20473 | 47k 5% 0.1W |
| 3680 | 4822 051 20472 | 4k7 5% 0.1W |
| 3681 | 4822 051 20472 | 4k7 5% 0.1W |
| 3683 | 4822 051 20103 | 10k 5% 0.1W |
| 3684 | 4822 100 11319 | 4k7 30%lin 0.1W |
| 3685 | 4822 051 20822 | 8k2 5% 0.1W |
| 3686 | 4822 051 20473 | 47k 5% 0.1W |
| 3687 | 4822 051 20471 | 470Ω 2% 0.25W |
| 3688 | 4822 051 20104 | 100k 5% 0.1W |
| 3689 | 4822 051 20273 | 27k 5% 0.1W |
| 3699 | 4822 051 20332 | 3k3 5% 0.1W |
| 3701 | 4822 051 20221 | 220Ω 5% 0.1W |
| 3702 | 4822 051 20221 | 220Ω 5% 0.1W |
| 3703 | 4822 051 20221 | 220Ω 5% 0.1W |
| 3704 | 4822 051 20221 | 220Ω 5% 0.1W |
| 3705 | 4822 116 83872 | 220Ω 5% 0.5W |
| 3706 | 4822 116 83872 | 220Ω 5% 0.5W |
| 3707 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3708 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3709 | 4822 051 20688 | 6Ω8 5% 0.1W |
| 3710 | 4822 051 20688 | 6Ω8 5% 0.1W |
| 3711 | 4822 051 20184 | 180k 5% 0.1W |
| 3712 | 4822 051 20184 | 180k 5% 0.1W |
| 3713 | 4822 117 11449 | 2k2 1% 0.1W |
| 3714 | 4822 117 11449 | 2k2 1% 0.1W |
| 3715 | 4822 051 20182 | 1k8 5% 0.1W |
| 3716 | 4822 051 20182 | 1k8 5% 0.1W |
| 3717 | 4822 051 20392 | 3k9 5% 0.1W |
| 3718 | 4822 051 20392 | 3k9 5% 0.1W |
| 3719 | 4822 051 20822 | 8k2 5% 0.1W |
| 3720 | 4822 051 20822 | 8k2 5% 0.1W |
| 3721 | 4822 051 20562 | 5k6 5% 0.1W |
| 3722 | 4822 051 20562 | 5k6 5% 0.1W |
| 3723 | 4822 117 11383 | 12k 1% 0.1W |

### RESISTORS

| | | |
|---|---|---|
| 3724 | 4822 117 11383 | 12k 1% 0.1W |
| 3725 | 4822 051 10102 | 1k 2% 0.25W |
| 3726 | 4822 051 10102 | 1k 2% 0.25W |
| 3727 | 4822 051 20562 | 5k6 5% 0.1W |
| 3728 | 4822 051 20562 | 5k6 5% 0.1W |
| 3729 | 4822 051 20272 | 2k7 5% 0.1W |
| 3730 | 4822 051 20272 | 2k7 5% 0.1W |
| 3731 | 4822 051 20682 | 6k8 5% 0.1W |
| 3732 | 4822 051 20682 | 6k8 5% 0.1W |
| 3765 | 4822 051 20393 | 39k 5% 0.1W |
| 3766 | 4822 051 20475 | 4M7 5% 0.1W |
| 3767 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3768 | 4822 051 20103 | 10k 5% 0.1W |
| 3769 | 4822 051 20103 | 10k 5% 0.1W<br>(For -/22 & -/25) |
| 3769 | 4822 051 20822 | 8k2 5% 0.1W |
| 3770 | 4822 117 11139 | 1k5 1% 0.1W |
| 3771 | 4822 051 20122 | 1k2 5% 0.1W |
| 3772 | 4822 051 20822 | 8k2 5% 0.1W |
| 3773 | 5322 100 11542 | 4k7 30%lin 0.1W |
| 3774 | 4822 116 52303 | 8k2 5% 0.5W |
| 3775 | 4822 051 20159 | 15Ω 5% 0.1W |
| 3776 | 4822 051 20682 | 6k8 5% 0.1W |
| 3777 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3778 | 4822 052 10109 | 10Ω 5% 0.33W |
| 3779 | 4822 051 20334 | 330k 5% 0.1W |
| 3780 | 4822 051 20105 | 1M 5% 0.1W |
| 3781 | 4822 051 20475 | 4M7 5% 0.1W |
| 3782 | 4822 051 20472 | 4k7 5% 0.1W |
| 3783 | 4822 051 20472 | 4k7 5% 0.1W |
| 3784 | 4822 051 20153 | 15k 5% 0.1W |
| 3785 | 5322 100 11539 | 100k 30%lin 0.1W |
| 3786 | 4822 117 11449 | 2k2 1% 0.1W |
| 3787 | 4822 116 52235 | 1M 5% 0.5W |
| 3788 | 4822 051 20105 | 1M 5% 0.1W |
| 3789 | 4822 051 20223 | 22k 5% 0.1W |
| 3790 | 4822 051 20473 | 47k 5% 0.1W |
| 3796 | 4822 051 10102 | 1k 2% 0.25W |
| 3797 | 4822 051 20104 | 100k 5% 0.1W |

## CASSETTE BOARD PARTLIST

### JUMPER

| | | |
|---|---|---|
| 4606 | 4822 051 20008 | 0Ω Jumper |
| 4607 | 4822 051 20008 | 0Ω Jumper |
| 4608 | 4822 051 20008 | 0Ω Jumper |
| 4609 | 4822 051 20008 | 0Ω Jumper |
| 4610 | 4822 051 20008 | 0Ω Jumper |
| 4611 | 4822 051 20008 | 0Ω Jumper |
| 4612 | 4822 051 20008 | 0Ω Jumper |
| 4614 | 4822 051 20008 | 0Ω Jumper |
| 4615 | 4822 051 20008 | 0Ω Jumper |
| 4616 | 4822 051 20008 | 0Ω Jumper |
| 4617 | 4822 051 20008 | 0Ω Jumper |
| 4618 | 4822 051 20008 | 0Ω Jumper |
| 4619 | 4822 051 20008 | 0Ω Jumper |
| 4620 | 4822 051 20008 | 0Ω Jumper |
| 4621 | 4822 051 20008 | 0Ω Jumper |
| 4622 | 4822 051 20008 | 0Ω Jumper |
| 4623 | 4822 051 20008 | 0Ω Jumper |
| 4624 | 4822 051 20008 | 0Ω Jumper |
| 4625 | 4822 051 20008 | 0Ω Jumper |
| 4626 | 4822 051 20008 | 0Ω Jumper |
| 4630 | 4822 051 20008 | 0Ω Jumper |
| 4631 | 4822 051 20008 | 0Ω Jumper |
| 4641 | 4822 051 20008 | 0Ω Jumper |
| 4647 | 4822 051 20008 | 0Ω Jumper |

### COIL

| | | |
|---|---|---|
| 5701 | 4822 156 20946 | Coil Osc 100kHz |
| 5702 | 4822 156 21721 | Coil 2.2µH 10% |
| 5703 | 4822 156 21721 | Coil 2.2µH 10% |

### DIODE

| | | |
|---|---|---|
| 6651 | 4822 130 30621 | 1N4148 |
| 6760 | 4822 130 34233 | BZX79-C5V1 |
| 6770 | 4822 130 30621 | 1N4148 |
| 6771 | 4822 130 30621 | 1N4148 |
| 6772 | 4822 130 30621 | 1N4148 |
| 6773 | 4822 130 30621 | 1N4148 |
| 6774 | 4822 130 30621 | 1N4148 |
| 6775 | 4822 130 30621 | 1N4148 |
| 6776 | 4822 130 30621 | 1N4148 |
| 6777 | 4822 130 34382 | BZX79-C8V2 |
| 6790 | 5322 130 30684 | 1N4002 |
| 6791 | 5322 130 30684 | 1N4002 |

### TRANSISTOR

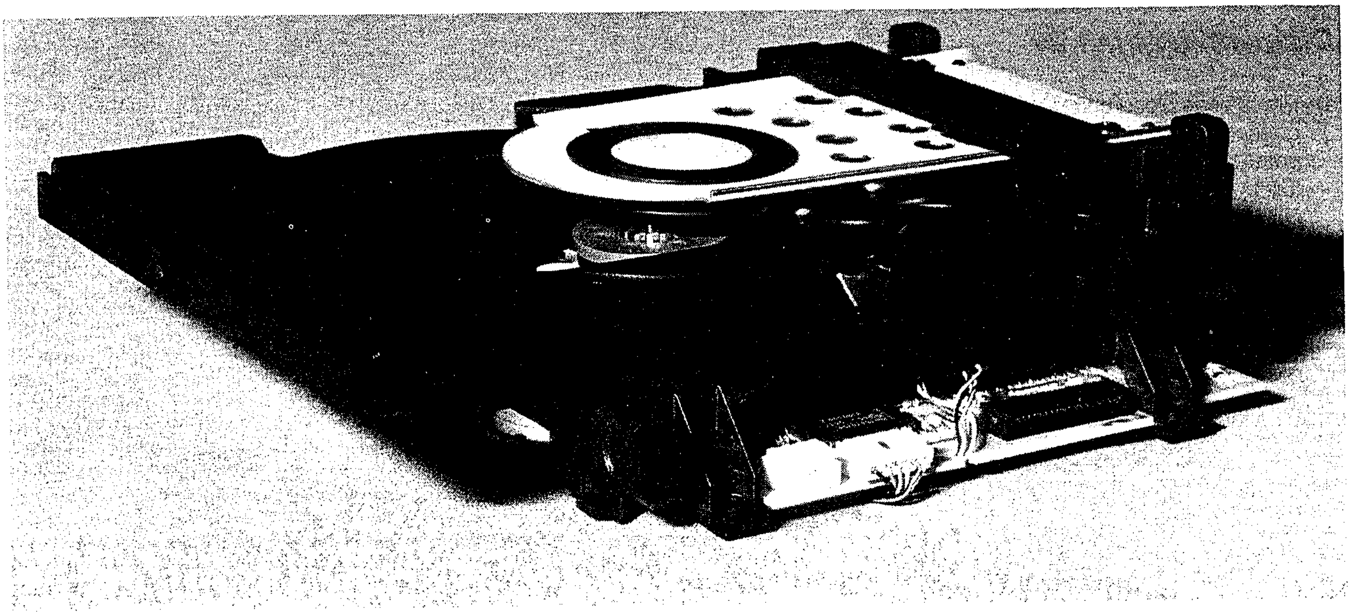
| | | |
|---|---|---|
| 7631 | 5322 130 42136 | BC848C (For -/22 & -/25) |
| 7632 | 5322 130 42136 | BC848C (For -/22 & -/25) |
| 7633 | 5322 130 42136 | BC848C (For -/22 & -/25) |
| 7634 | 5322 130 42136 | BC848C (For -/22 & -/25) |
| 7650 | 5322 130 42136 | BC848C |
| 7651 | 4822 130 42513 | BC858C |
| 7652 | 5322 130 42136 | BC848C |
| 7653 | 5322 130 60123 | BC807-40 |
| 7654 | 5322 130 42136 | BC848C |
| 7655 | 5322 130 60123 | BC807-40 |

### TRANSISTORS

| | | |
|---|---|---|
| 7661 | 5322 130 60123 | BC807-40 |
| 7662 | 5322 130 42136 | BC848C |
| 7663 | 4822 130 42513 | BC858C |
| 7665 | 4822 130 42513 | BC858C |
| 7666 | 5322 130 42136 | BC848C |
| 7780 | 5322 130 42136 | BC848C |
| 7781 | 5322 130 42136 | BC848C |
| 7782 | 5322 130 60068 | BC558C |
| 7783 | 5322 130 42136 | BC848C |
| 7784 | 4822 130 60373 | BC856B |
| 7785 | 4822 130 63494 | J111 |
| 7786 | 4822 130 63494 | J111 |
| 7787 | 5322 130 42136 | BC848C |
| 7788 | 5322 130 42136 | BC848C |

### INTERGRATED CIRCUITS

| | | |
|---|---|---|
| 7630 | 4822 209 90406 | CXA1101M (For -/22 & -/25) |
| 7640 | 4822 209 83357 | NJM4560M (For -/22 & -/25) |
| 7710 | 4822 209 32919 | HEF4952BT |
| 7720 | 4822 209 32918 | AN7318S |
| 7730 | 4822 209 32919 | HEF4952BT |
| 7740 | 4822 209 32919 | HEF4952BT |
| 7750 | 5322 209 11306 | HEF4094BT |
| 7760 | 4822 209 32919 | HEF4952BT<br>(For -/22 & -/25) |



# ECO SHORT LOADER UNIT

for Systems

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# Dismantling hints CD Short Loader

## Dismantling the tray

a) Press open/close button to open the tray. If the tray doesn´t work, use a small screwdriver as shown in Fig.1 point 1 to move the tray outside. After the first centimetre it is possible to pull the tray out by hand.

b) Release two snaps and remove tray.

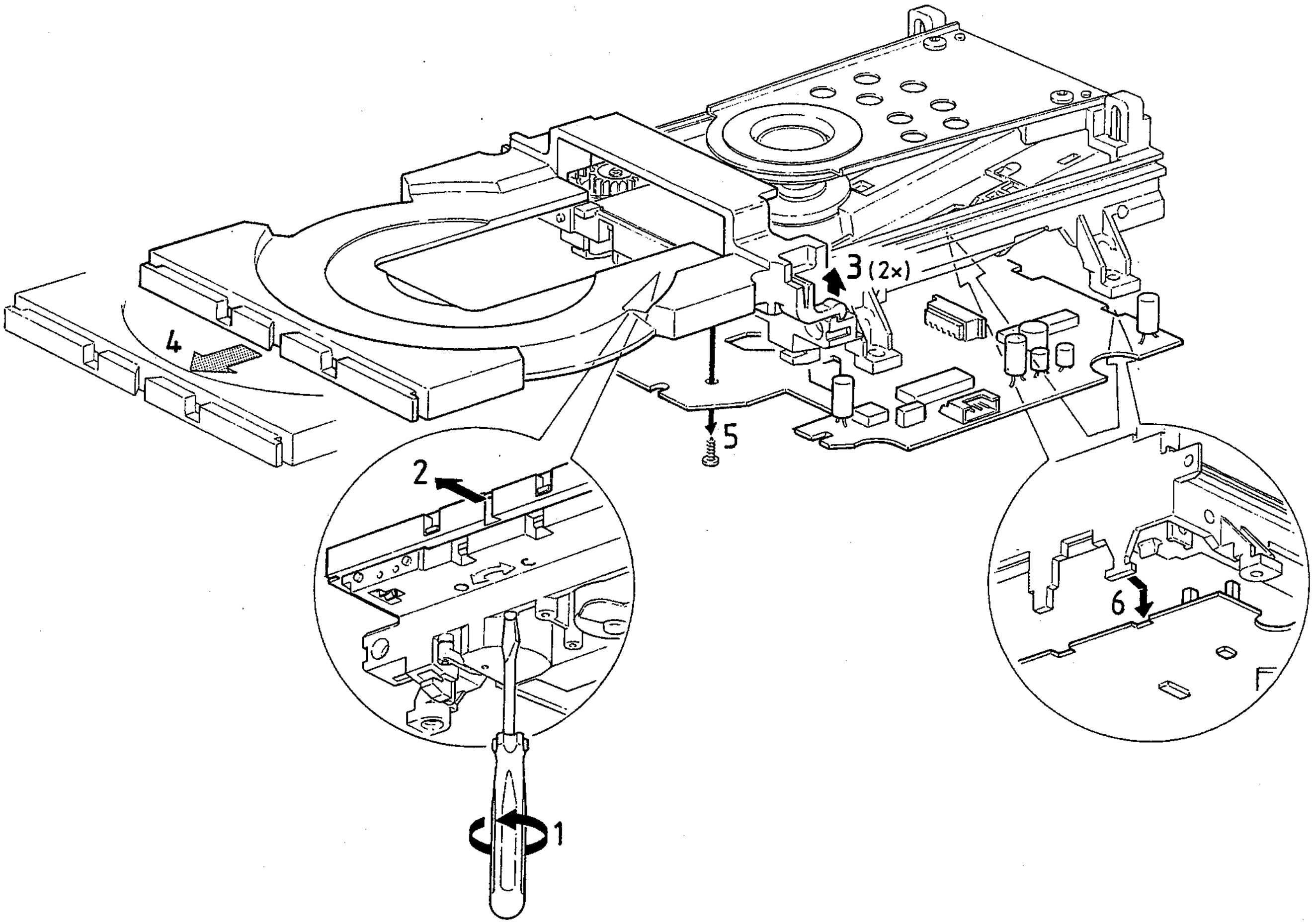


Fig. 1

## Assembly of gear

a) Use a pin (e.g. a paperclip) to align the cam wheel (a) withthe gear wheel (b). See Fig. 2.

b) Fix the wheels with the small plastic whashers.

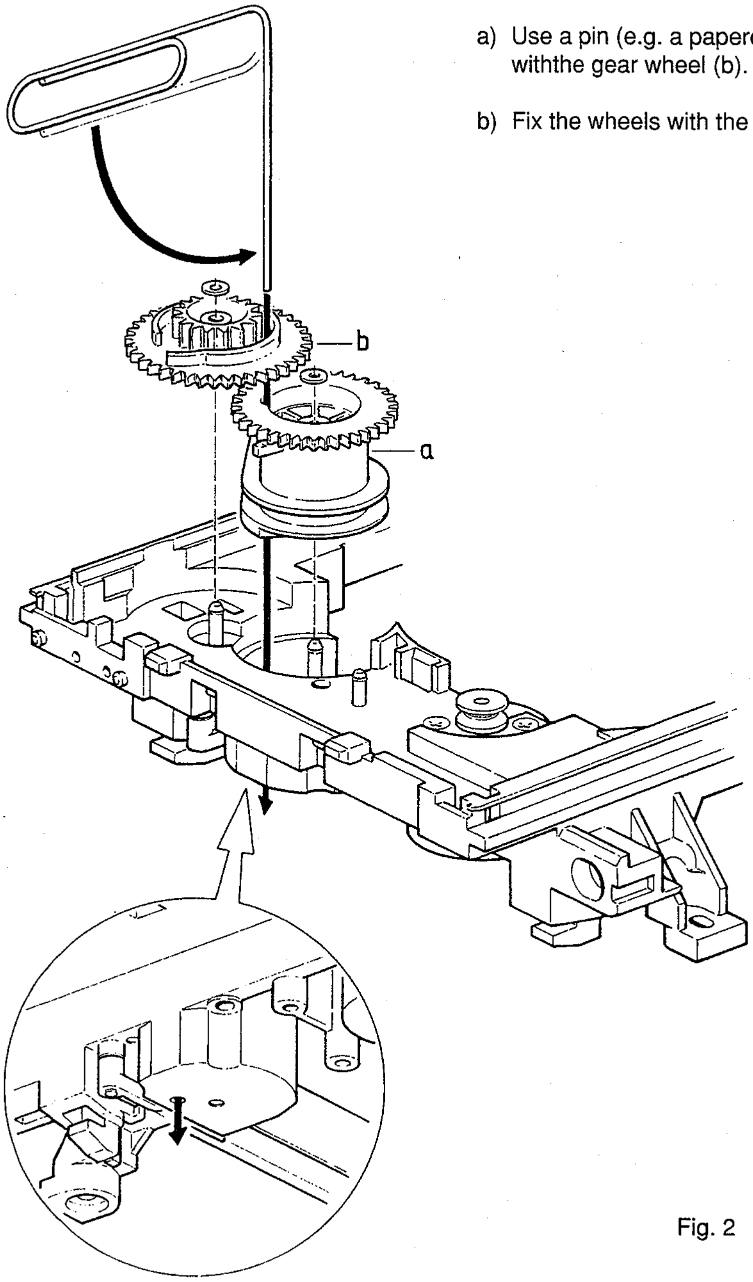


Fig. 2

c) Mount idle wheel 2 (c) and idle wheel 1 (d) in any position. See Fig. 3.

d) Fix the idle wheel 1 (d) with the small plastic whasher.

e) Mount the driving belt.

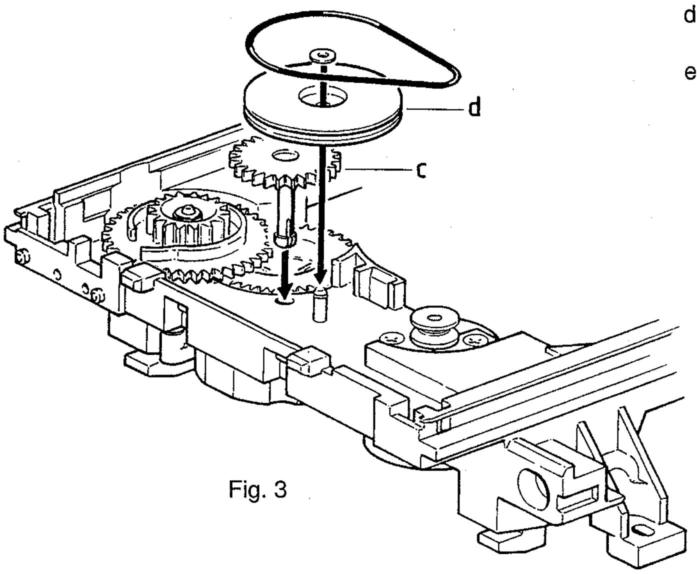


Fig. 3

f) Mount the pinion guiding assy and the cover as shown in Fig. 4.

g) Turn the gear wheel (b) counter clockwise to endposition.

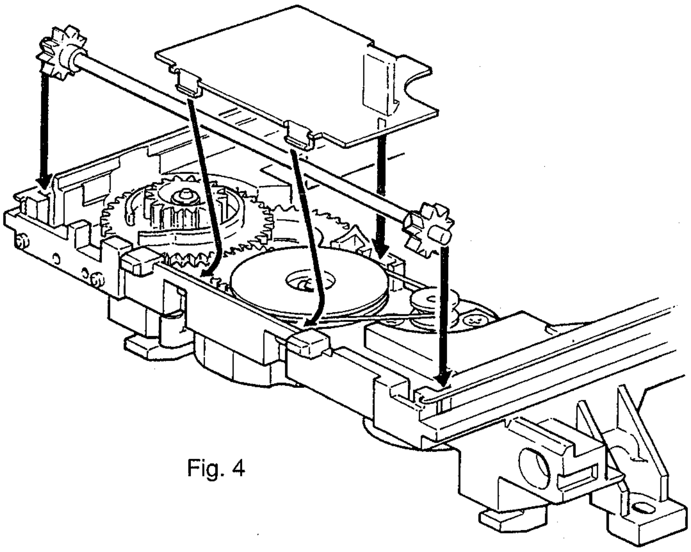


Fig. 4

h) Mount the CD Mechanism as shown in Fig. 5.

i) Mount the tray (Align the tray to the chassis and push it inside).

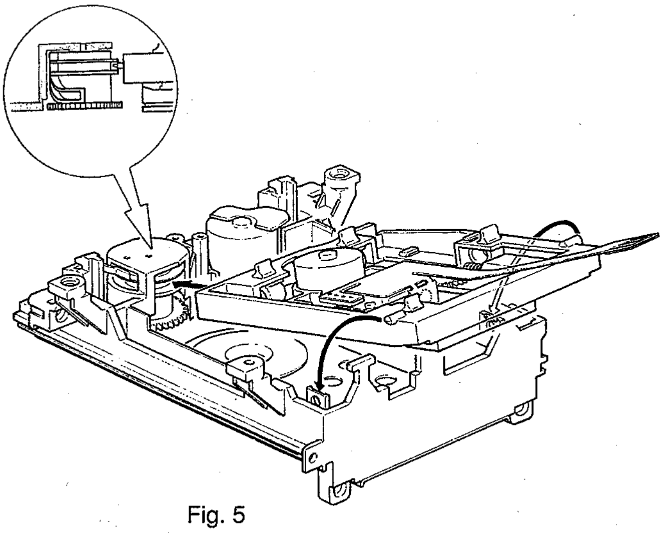


Fig. 5

## *Check if tray mechanism works correctly!*

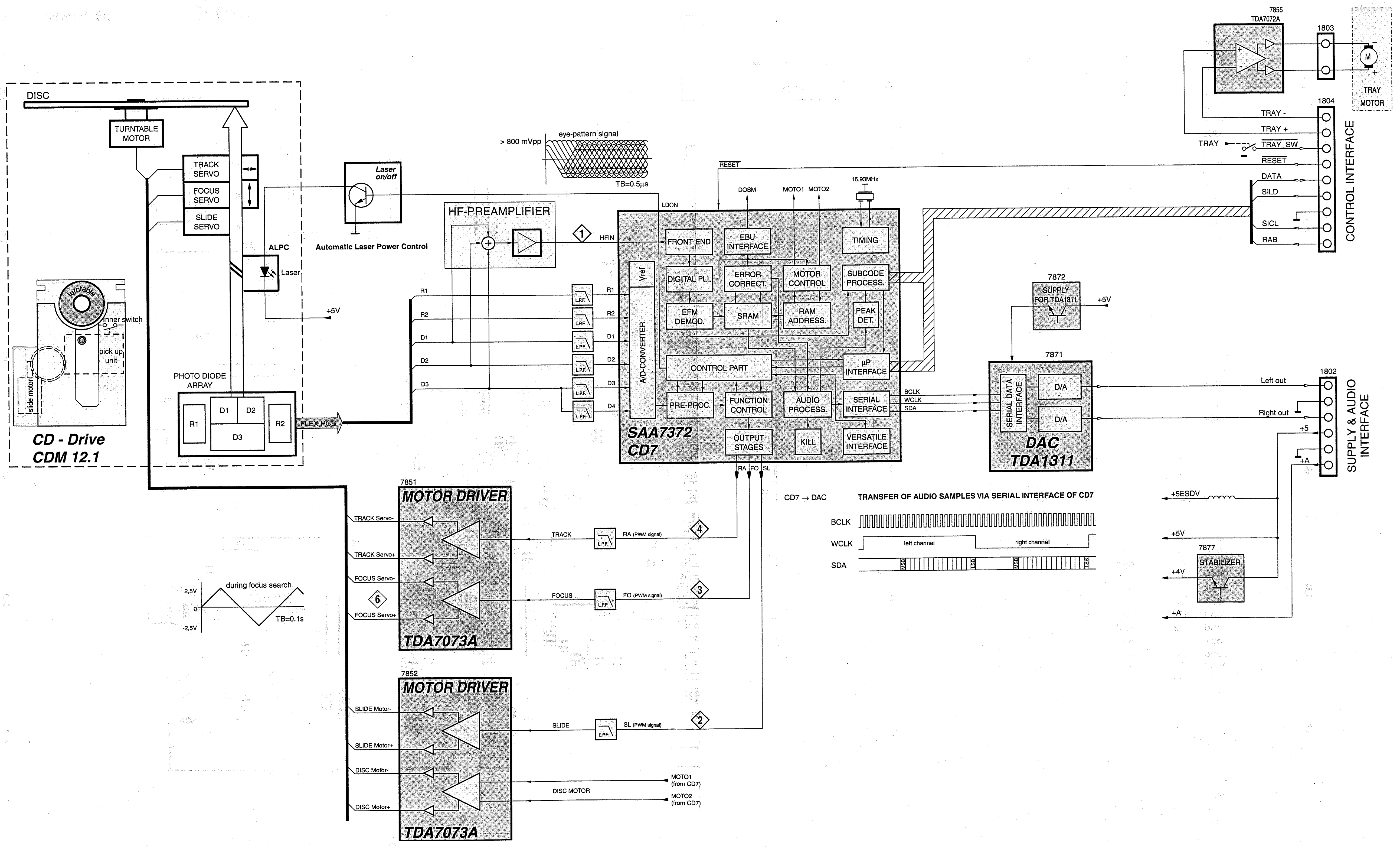
1) Turn the gear wheel (b) clockwise to its endposition (Use a small screwdriver as shown in Fig. 1 point 1).

   The tray has to move to inner position first and then the CD mechanism has to move to its upper position.

2) Turn the gear wheel (b) counter clockwise to its endposition.

   The CD Mechanism has to move to its lower position first and then the tray has to move outside.

## **Functional Diagram** *ECO Short Loader with CD7*


DISC
TURNTABLE MOTOR
TRACK SERVO
FOCUS SERVO
SLIDE SERVO
ALPC
Laser
turntable
inner switch
pick up unit
slide motor
PHOTO DIODE ARRAY
D1
D2
R1
R2
D3
CD - Drive
CDM 12.1
FLEX PCB
Laser on/off
Automatic Laser Power Control
+5V
HF-PREAMPLIFIER
1
HFIN
> 800 mVpp
eye-pattern signal
TB=0.5µs
LDON
RESET
DOBM
MOTO1
MOTO2
16.93MHz
R1
R2
D1
D2
D3
D4
L.P.F.
Vref
A/D-CONVERTER
FRONT END
EBU INTERFACE
TIMING
DIGITAL PLL
ERROR CORRECT.
MOTOR CONTROL
SUBCODE PROCESS.
EFM DEMOD.
SRAM
RAM ADDRESS.
PEAK DET.
CONTROL PART
µP INTERFACE
PRE-PROC.
FUNCTION CONTROL
AUDIO PROCESS.
SERIAL INTERFACE
OUTPUT STAGES
KILL
VERSATILE INTERFACE
SAA7372
CD7
RA
FO
SL
BCLK
WCLK
SDA
7872
SUPPLY FOR TDA1311
+5V
7871
SERIAL DATA INTERFACE
D/A
D/A
DAC
TDA1311
7855
TDA7072A
1803
M
TRAY MOTOR
1804
TRAY -
TRAY +
TRAY
TRAY_SW
RESET
DATA
SILD
SICL
RAB
CONTROL INTERFACE
1802
Left out
Right out
+5
+A
SUPPLY & AUDIO INTERFACE
+5ESDV
+5V
7877
STABILIZER
+4V
+A
CD7 → DAC
TRANSFER OF AUDIO SAMPLES VIA SERIAL INTERFACE OF CD7
BCLK
WCLK
left channel
right channel
SDA
MSB
LSB
MSB
LSB
7851
MOTOR DRIVER
TRACK Servo-
TRACK Servo+
FOCUS Servo-
FOCUS Servo+
6
TDA7073A
TRACK
RA (PWM signal)
4
FOCUS
FO (PWM signal)
3
2,5V
0
-2,5V
during focus search
TB=0.1s
7852
MOTOR DRIVER
SLIDE Motor-
SLIDE Motor+
DISC Motor-
DISC Motor+
TDA7073A
SLIDE
SL (PWM signal)
2
DISC MOTOR
MOTO1 (from CD7)
MOTO2 (from CD7)

Abl

SAA

Pir
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
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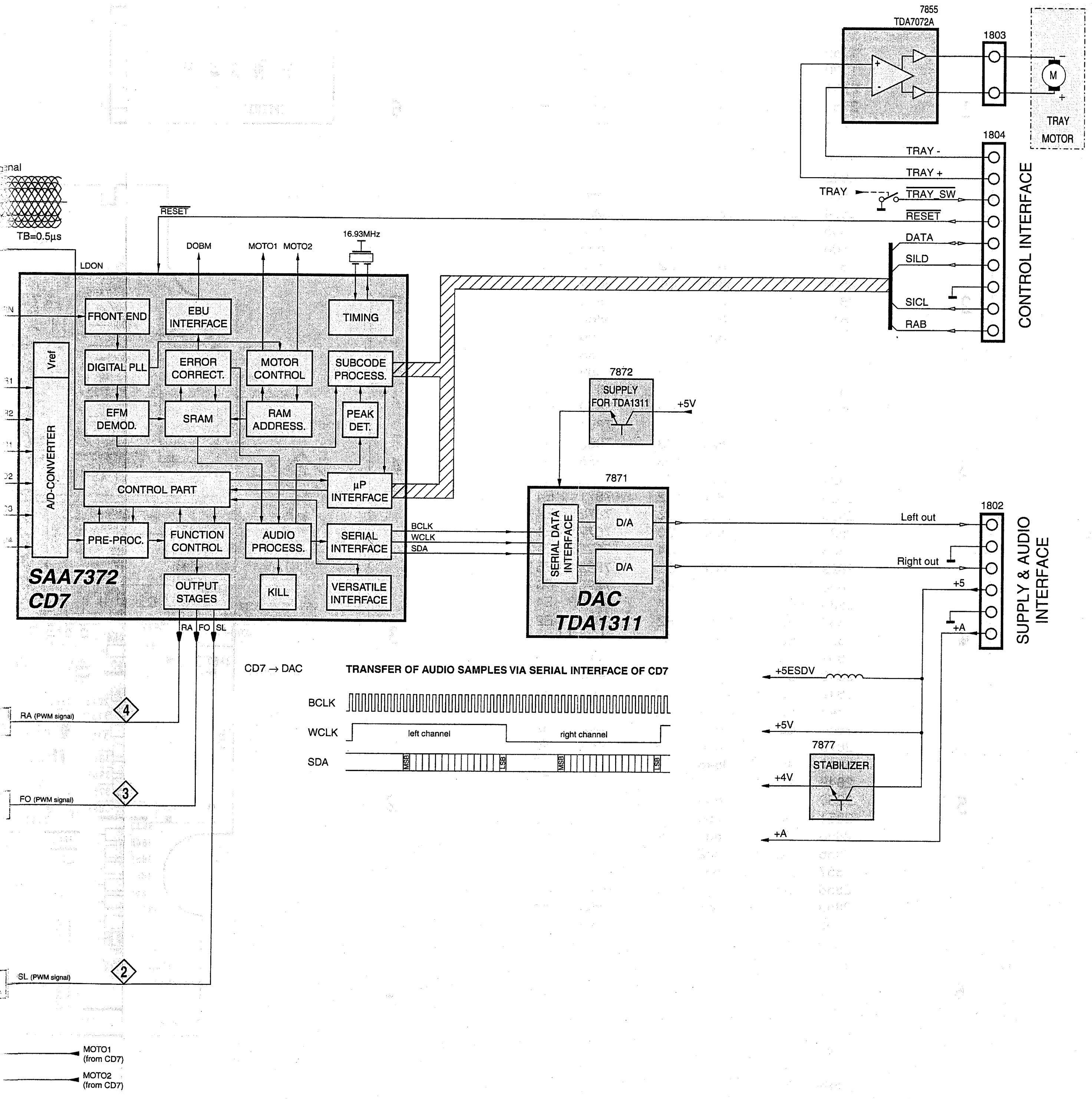
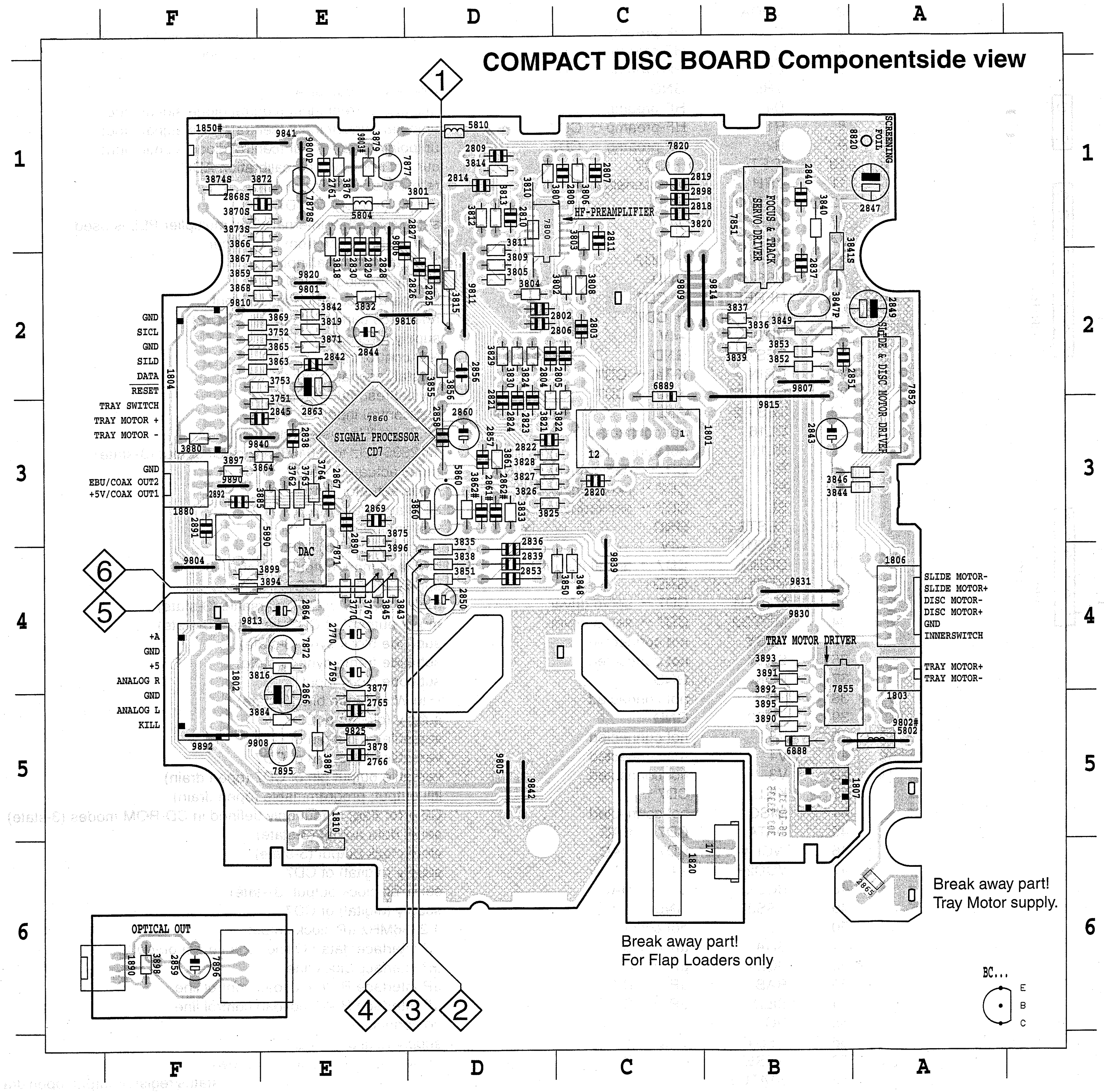

7855
TDA7072A
1803
M
TRAY
MOTOR
1804
TRAY -
TRAY +
TRAY
TRAY_SW
RESET
DATA
SILD
SICL
RAB
CONTROL INTERFACE
TB=0.5µs
RESET
LDON
DOBM
MOTO1
MOTO2
16.93MHz
FRONT END
EBU INTERFACE
TIMING
Vref
DIGITAL PLL
ERROR CORRECT.
MOTOR CONTROL
SUBCODE PROCESS.
EFM DEMOD.
SRAM
RAM ADDRESS.
PEAK DET.
A/D-CONVERTER
CONTROL PART
µP INTERFACE
PRE-PROC.
FUNCTION CONTROL
AUDIO PROCESS.
SERIAL INTERFACE
SAA7372
CD7
OUTPUT STAGES
KILL
VERSATILE INTERFACE
RA
FO
SL
BCLK
WCLK
SDA
7872
SUPPLY FOR TDA1311
+5V
7871
SERIAL DATA INTERFACE
D/A
D/A
DAC
TDA1311
1802
Left out
Right out
+5
+A
SUPPLY & AUDIO INTERFACE
CD7 → DAC
TRANSFER OF AUDIO SAMPLES VIA SERIAL INTERFACE OF CD7
BCLK
WCLK
left channel
right channel
SDA
MSB
LSB
MSB
LSB
+5ESDV
+5V
7877
STABILIZER
+4V
+A
RA (PWM signal)
4
FO (PWM signal)
3
SL (PWM signal)
2
MOTO1
(from CD7)
MOTO2
(from CD7)

# Abbreviations CD Part

## SAA7372 - DECORDER AND DIGITAL SERVO IC CD7

| Pin | Name | Direction | Description |
|---|---|---|---|
| 1 | VSSA1 | GND | supply (analog) of CD7 |
| 2 | VDDA1 | +4V | supply (analog) of CD7 |
| 3 | D1 | HF-preamp → CD7 | unipolar current input (central diode signal input) |
| 4 | D2 | HF-preamp → CD7 | unipolar current input (central diode signal input) |
| 5 | D3 | HF-preamp → CD7 | unipolar current input (central diode signal input) |
| 6 | VRL | GND | reference input for ADC |
| 7 | D4 | HF-preamp → CD7 | unipolar current input (central diode signal input) |
| 8 | R1 | HF-preamp → CD7 | unipolar current input (central diode signal input) |
| 9 | R2 | HF-preamp → CD7 | unipolar current input (central diode signal input) |
| 10 | IRET | → CD7 | current reference for calibration ADC |
| 11 | VRH | not connected | reference output from ADC |
| 12 | VSSA2 | GND | supply (analog) of CD7 |
| 13 | SELPLL | +4V | selects whether internal clock multiplier PLL is used |
| 14 | ISLICE | CD7 → | current feedback from data slicer |
| 15 | HFIN | → CD7 | comparator signal input |
| 16 | VSSA3 | GND | supply (analog) of CD7 |
| 17 | HFREF | → CD7 | comparator common mode input |
| 18 | IREF | → CD7 | reference current pin (nom. VDD/2) |
| 19 | VDDA2 | +4V | supply (analog) of CD7 |
| 20 | TEST 1 | GND | test control input |
| 21 | CRIN | X-Tal → CD7 | crystal/resonator input |
| 22 | CDOUT | X-Tal → CD7 | crystal/resonator output |
| 23 | TEST 2 | GND | test control input |
| 24 | CL16 | not connected | 16.9344MHz system clock output |
| 25 | CL11 | not connected | 11.2896MHz to 5.6448MHz clock output (3-state) |
| 26 | RA | CD7 → servo driver | radial actuator output |
| 27 | FO | CD7 → servo driver | focus actuator output |
| 28 | SL | CD7 → servo driver | slide actuator output |
| 29 | TEST3 | GND | test control input |
| 30 | VDD1P | +4V | supply (digital) of CD7 |
| 31 | DOBM | CD7 → digital output | bi-phase mark output (3-state) |
| 32 | VSS1 | GND | supply (digital) of CD7 |
| 33 | MOTO1 | CD7 → servo driver | motor output1 of CD7; versatile (3-state) |
| 34 | MOTO2 | CD7 → servo driver | motor output2 of CD7; versatile (3-state) |
| 35 | SBSY | not connected | subcode block sync (3-state) |
| 36 | SFSY | not connected | subcode frame sync (3-state) |
| 37 | RCK | GND | subcode clock input |
| 38 | SUB | not connected | P to W subcode bits (3-state) |
| 39 | VSS2 | GND | supply (digital) of CD7 |
| 40 | V5 | not connected | versatile output pin of CD7 |
| 41 | V4 | not connected | versatile output pin of CD7 |
| 42 | V3 | not connected | versatile output pin of CD7 (open drain) |
| 43 | KILL | CD7 → | kill output; programmable (open drain) |
| 44 | MISC | not connected | C2 error flag; output only defined in CD-ROM modes (3-state) |
| 45 | DATA | CD7 → DAC | serial data output (3-state) |
| 46 | WCLK | CD7 → DAC | word clock output (3-state) |
| 47 | VDD2P | +4V | supply (digital) of CD7 |
| 48 | BCLK | CD7 → DAC | serial bit clock output (3-state) |
| 49 | VSS3 | GND | supply (digital) of CD7 |
| 50 | CL4 | not connected | 4.2336MHz µP clock output |
| 51 | SDA | µP → CD7 | µP interface data I/O line (open drain output) |
| 52 | SCL | µP → CD7 | µP interface clock line |
| 53 | RAB | µP → CD7 | µP interface R/W and load control line |
| 54 | SILD | µP → CD7 | µP interface R/W and load control line |
| 55 | NC |  | no connection |
| 56 | VSS4 | GND | supply (digital) of CD7 |
| 57 | RESET | µP → CD7 | power-on reset input (active low) |
| 58 | STATUS | not connected | servo interupt request line /CD7 status register output (open drain) |
| 59 | VDD3C | +4V | supply core (digital) |
| 60 | C2FAIL | not connected | indication of correction failure (open drain) |
| 61 | CFLG | not connected | correction falg output (open drain) |
| 62 | V1 | → CD7 | verstaile input pin |
| 63 | V2 | → CD7 | verstaile input pin |
| 64 | LDON | CD7 → 7820 | laser drive on output (open drain) |

## COMPACT DISC BOARD Componentside view


F
E
D
C
B
A
1
2
3
4
5
6
SIGNAL PROCESSOR
CD7
HF-PREAMPLIFIER
FOCUS & TRACK SERVO DRIVER
SLIDE & DISC MOTOR DRIVER
SCREENING FOIL
DAC
TRAY MOTOR DRIVER
OPTICAL OUT
GND
SICL
GND
SILD
DATA
RESET
TRAY SWITCH
TRAY MOTOR +
TRAY MOTOR -
GND
EBU/COAX OUT2
+5V/COAX OUT1
+A
GND
+5
ANALOG R
GND
ANALOG L
KILL
SLIDE MOTOR-
SLIDE MOTOR+
DISC MOTOR-
DISC MOTOR+
GND
INNERSWITCH
TRAY MOTOR+
TRAY MOTOR-
BC...
E
B
C
①
②
③
④
⑤
⑥

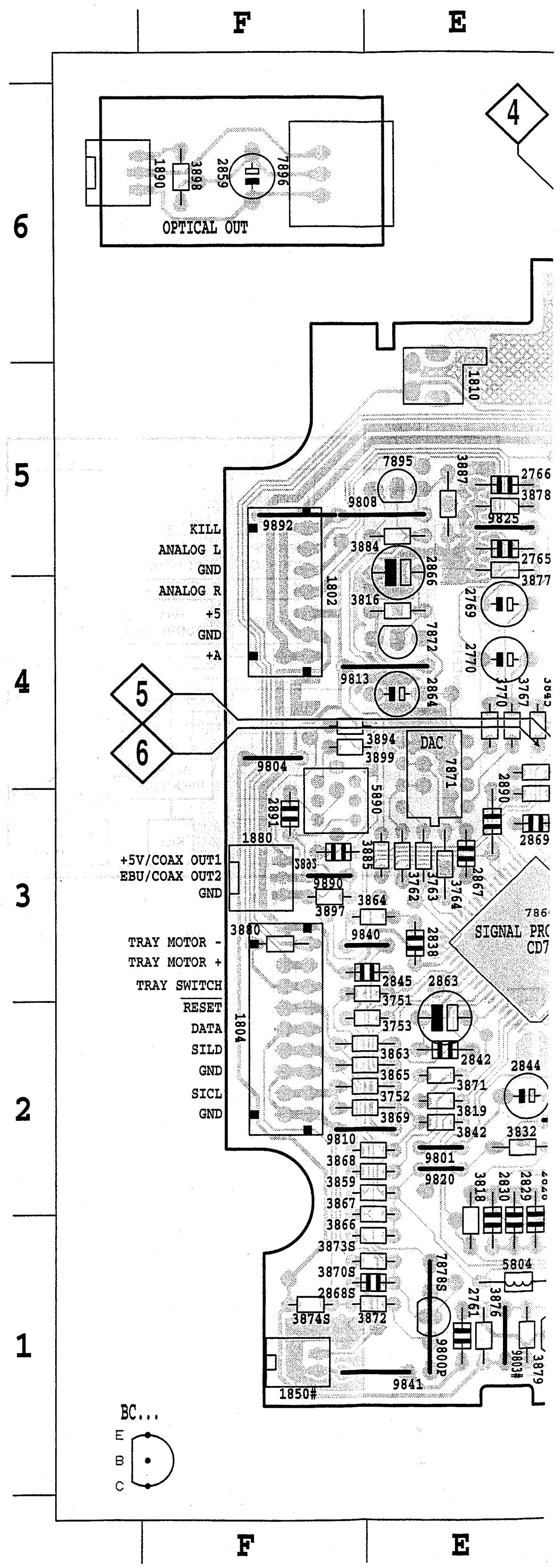
Break away part!
For Flap Loaders only

Break away part!
Tray Motor supply.

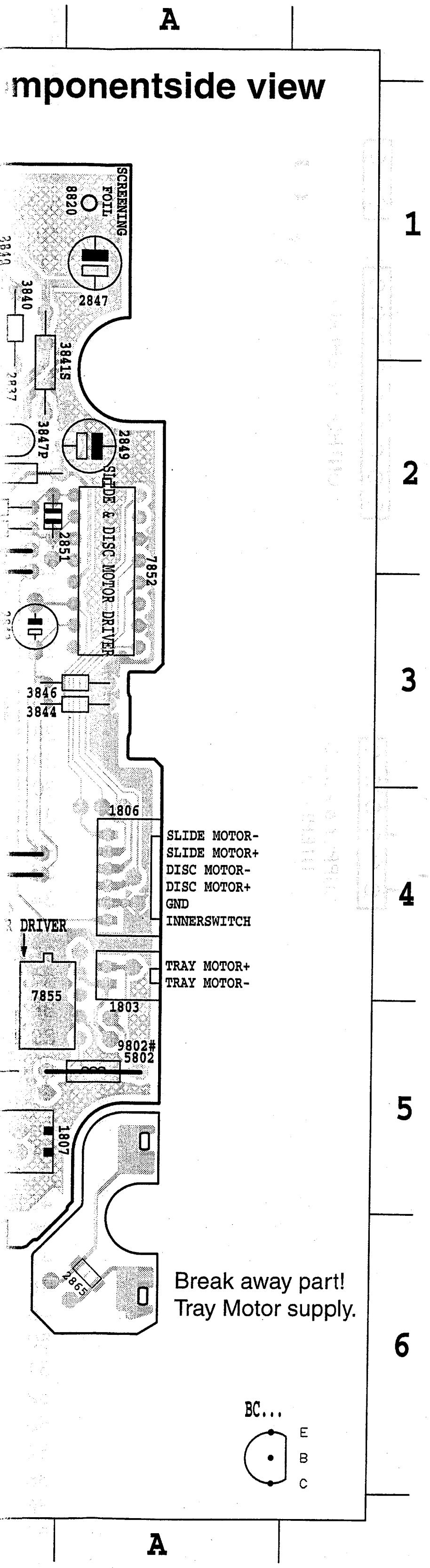
| | | | | | |
|---|---|---|---|---|---|
| 17 | B6 | 3751 | F3 | 3873S | E1 |
| 1801 | C3 | 3752 | F2 | 3874S | F1 |
| 1802 | F4 | 3753 | F2 | 3875 | E3 |
| 1803 | A4 | 3762 | E3 | 3876 | E1 |
| 1804 | F2 | 3763 | E3 | 3877 | E5 |
| 1806 | A4 | 3764 | E3 | 3878 | E5 |
| 1807 | B5 | 3767 | E4 | 3879 | E1 |
| 1810 | E5 | 3770 | E4 | 3880 | F3 |
| 1820 | C5 | 3801 | D1 | 3884 | E5 |
| 1850# | F1 | 3802 | C2 | 3885 | E3 |
| 1880 | F3 | 3803 | C1 | 3887 | E5 |
| 1890 | F6 | 3804 | D2 | 3888 | F6 |
| 2761 | E1 | 3805 | D2 | 3890 | B5 |
| 2765 | E5 | 3806 | C1 | 3891 | B4 |
| 2766 | E5 | 3807 | D1 | 3892 | B5 |
| 2769 | E4 | 3808 | C2 | 3893 | B4 |
| 2770 | E4 | 3809 | D2 | 3894 | F4 |
| 2802 | D2 | 3810 | D1 | 3895 | B5 |
| 2803 | C2 | 3811 | D1 | 3896 | E4 |
| 2804 | D2 | 3812 | D1 | 3897 | F3 |
| 2805 | C2 | 3813 | D1 | 3898 | F6 |
| 2806 | D2 | 3814 | D1 | 3899 | F4 |
| 2807 | C1 | 3815 | D2 | 5802 | A5 |
| 2808 | C1 | 3816 | E4 | 5804 | E1 |
| 2809 | D1 | 3818 | E1 | 5810 | D1 |
| 2810 | D1 | 3819 | E2 | 5860 | D3 |
| 2811 | C1 | 3820 | C1 | 5890 | F3 |
| 2814 | D1 | 3821 | D3 | 6888 | B5 |
| 2818 | C1 | 3822 | C3 | 6889 | C2 |
| 2819 | C1 | 3824 | D2 | 7800 | D1 |
| 2820 | C3 | 3825 | D3 | 7820 | C1 |
| 2821 | D3 | 3826 | D3 | 7851 | B1 |
| 2822 | D3 | 3827 | D3 | 7852 | A2 |
| 2823 | D3 | 3828 | D3 | 7855 | B5 |
| 2824 | D3 | 3829 | D2 | 7860 | E3 |
| 2825 | D2 | 3830 | D2 | 7871 | E4 |
| 2826 | D2 | 3832 | E2 | 7872 | E4 |
| 2827 | E1 | 3833 | D3 | 7877 | E1 |
| 2828 | E1 | 3835 | D4 | 7878S | E1 |
| 2829 | E1 | 3836 | B2 | 7895 | E5 |
| 2830 | E1 | 3837 | B2 | 7896 | F6 |
| 2836 | D4 | 3838 | D4 | 9800P | E1 |
| 2837 | B2 | 3839 | B2 | 9801 | E2 |
| 2838 | E3 | 3840 | B1 | 9803# | E1 |
| 2839 | D4 | 3842 | E2 | 9804 | F4 |
| 2840 | B1 | 3841S | B2 | 9805 | D5 |
| 2842 | E2 | 3843 | E4 | 9806 | E1 |
| 2843 | B3 | 3844 | A3 | 9802# | A5 |
| 2844 | E2 | 3845 | E4 | 9807 | B2 |
| 2845 | F3 | 3846 | A3 | 9808 | E5 |
| 2847 | A1 | 3848 | C4 | 9809 | C2 |
| 2849 | A2 | 3847P | B2 | 9810 | F2 |
| 2850 | D4 | 3849 | B2 | 9811 | D2 |
| 2851 | B2 | 3850 | C4 | 9813 | E4 |
| 2853 | D4 | 3851 | D4 | 9814 | B2 |
| 2856 | D2 | 3852 | B2 | 9815 | B2 |
| 2857 | D3 | 3853 | B2 | 9816 | E2 |
| 2858 | D3 | 3855 | D2 | 9820 | E2 |
| 2859 | F6 | 3856 | D2 | 9825 | E5 |
| 2860 | D3 | 3859 | E2 | 9830 | B4 |
| 2863 | E2 | 3860 | D3 | 9831 | B4 |
| 2861# | D3 | 3861 | D3 | 9839 | C4 |
| 2864 | E4 | 3863 | F2 | 9840 | F3 |
| 2865 | A6 | 3864 | E3 | 9841 | E1 |
| 2862# | D3 | 3862# | D3 | 9842 | D5 |
| 2866 | E5 | 3865 | F2 | 9890 | F3 |
| 2867 | E3 | 3866 | E1 | 9892 | F5 |
| 2868S | E1 | 3867 | E2 | | |
| 2869 | E3 | 3868 | E2 | | |
| 2890 | E3 | 3869 | F2 | | |
| 2891 | F3 | 3870S | E1 | | |
| 2892 | F3 | 3871 | E2 | | |
| 2898 | C1 | 3872 | E1 | | |

S = for Systems
P = for Portables
# = provisional

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram respectively partslist.


F
E
1
2
3
4
5
6
OPTICAL OUT
DAC
SIGNAL PRO
CD7
KILL
ANALOG L
GND
ANALOG R
+5
GND
+A
+5V/COAX OUT1
EBU/COAX OUT2
GND
TRAY MOTOR -
TRAY MOTOR +
TRAY SWITCH
RESET
DATA
SILD
GND
SICL
GND
BC...
E
B
C
④
⑤
⑥

## mponentside view


A
1
2
3
4
5
6
SCREENING FOIL
8820
2847
3840
3841S
3847P
2849
SLIDE & DISC MOTOR DRIVER
7852
2851
3846
3844
1806
SLIDE MOTOR-
SLIDE MOTOR+
DISC MOTOR-
DISC MOTOR+
GND
INNERSWITCH
DRIVER
7855
TRAY MOTOR+
TRAY MOTOR-
1803
9802#
5802
1807
2865
Break away part!
Tray Motor supply.
BC...
E
B
C

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| 17 | B6 | 3751 | F3 | 3873S | E1 |
| 1801 | C3 | 3752 | F2 | 3874S | F1 |
| 1802 | F4 | 3753 | F2 | 3875 | E3 |
| 1803 | A4 | 3762 | E3 | 3876 | E1 |
| 1804 | F2 | 3763 | E3 | 3877 | E5 |
| 1806 | A4 | 3764 | E3 | 3878 | E5 |
| 1807 | B5 | 3767 | E4 | 3879 | E1 |
| 1810 | E5 | 3770 | E4 | 3880 | F3 |
| 1820 | C5 | 3801 | D1 | 3884 | E5 |
| 1850# | F1 | 3802 | C2 | 3885 | E3 |
| 1880 | F3 | 3803 | C1 | 3887 | E5 |
| 1890 | F6 | 3804 | D2 | 3888 | F6 |
| 2761 | E1 | 3805 | D2 | 3890 | B5 |
| 2765 | E5 | 3806 | C1 | 3891 | B4 |
| 2766 | E5 | 3807 | D1 | 3892 | B5 |
| 2769 | E4 | 3808 | C2 | 3893 | B4 |
| 2770 | E4 | 3809 | D2 | 3894 | F4 |
| 2802 | D2 | 3810 | D1 | 3895 | B5 |
| 2803 | C2 | 3811 | D1 | 3896 | E4 |
| 2804 | D2 | 3812 | D1 | 3897 | F3 |
| 2805 | C2 | 3813 | D1 | 3898 | F6 |
| 2806 | D2 | 3814 | D1 | 3899 | F4 |
| 2807 | C1 | 3815 | D2 | 5802 | A5 |
| 2808 | C1 | 3816 | E4 | 5804 | E1 |
| 2809 | D1 | 3818 | E1 | 5810 | D1 |
| 2810 | D1 | 3819 | E2 | 5860 | D3 |
| 2811 | C1 | 3820 | C1 | 5890 | F3 |
| 2814 | D1 | 3821 | D3 | 6888 | B5 |
| 2818 | C1 | 3822 | C3 | 6889 | C2 |
| 2819 | C1 | 3824 | D2 | 7800 | D1 |
| 2820 | C3 | 3825 | D3 | 7820 | C1 |
| 2821 | D3 | 3826 | D3 | 7851 | B1 |
| 2822 | D3 | 3827 | D3 | 7852 | A2 |
| 2823 | D3 | 3828 | D3 | 7855 | B5 |
| 2824 | D3 | 3829 | D2 | 7860 | E3 |
| 2825 | D2 | 3830 | D2 | 7871 | E4 |
| 2826 | D2 | 3832 | E2 | 7872 | E4 |
| 2827 | E1 | 3833 | D3 | 7877 | E1 |
| 2828 | E1 | 3835 | D4 | 7878S | E1 |
| 2829 | E1 | 3836 | B2 | 7895 | E5 |
| 2830 | E1 | 3837 | B2 | 7896 | F6 |
| 2836 | D4 | 3838 | D4 | 9800P | E1 |
| 2837 | B2 | 3839 | B2 | 9801 | E2 |
| 2838 | E3 | 3840 | B1 | 9803# | E1 |
| 2839 | D4 | 3842 | E2 | 9804 | F4 |
| 2840 | B1 | 3841S | B2 | 9805 | D5 |
| 2842 | E2 | 3843 | E4 | 9806 | E1 |
| 2843 | B3 | 3844 | A3 | 9802# | A5 |
| 2844 | E2 | 3845 | E4 | 9807 | B2 |
| 2845 | F3 | 3846 | A3 | 9808 | E5 |
| 2847 | A1 | 3848 | C4 | 9809 | C2 |
| 2849 | A2 | 3847P | B2 | 9810 | F2 |
| 2850 | D4 | 3849 | B2 | 9811 | D2 |
| 2851 | B2 | 3850 | C4 | 9813 | E4 |
| 2853 | D4 | 3851 | D4 | 9814 | B2 |
| 2856 | D2 | 3852 | B2 | 9815 | B2 |
| 2857 | D3 | 3853 | B2 | 9816 | E2 |
| 2858 | D3 | 3855 | D2 | 9820 | E2 |
| 2859 | F6 | 3856 | D2 | 9825 | E5 |
| 2860 | D3 | 3859 | E2 | 9830 | B4 |
| 2863 | E2 | 3860 | D3 | 9831 | B4 |
| 2861# | D3 | 3861 | D3 | 9839 | C4 |
| 2864 | E4 | 3863 | F2 | 9840 | F3 |
| 2865 | A6 | 3864 | E3 | 9841 | E1 |
| 2862# | D3 | 3862# | D3 | 9842 | D5 |
| 2866 | E5 | 3865 | F2 | 9890 | F3 |
| 2867 | E3 | 3866 | E1 | 9892 | F5 |
| 2868S | E1 | 3867 | E2 |  |  |
| 2869 | E3 | 3868 | E2 |  |  |
| 2890 | E3 | 3869 | F2 |  |  |
| 2891 | F3 | 3870S | E1 |  |  |
| 2892 | F3 | 3871 | E2 |  |  |
| 2898 | C1 | 3872 | E1 |  |  |

S = for Systems
P = for Portables
# = provisional

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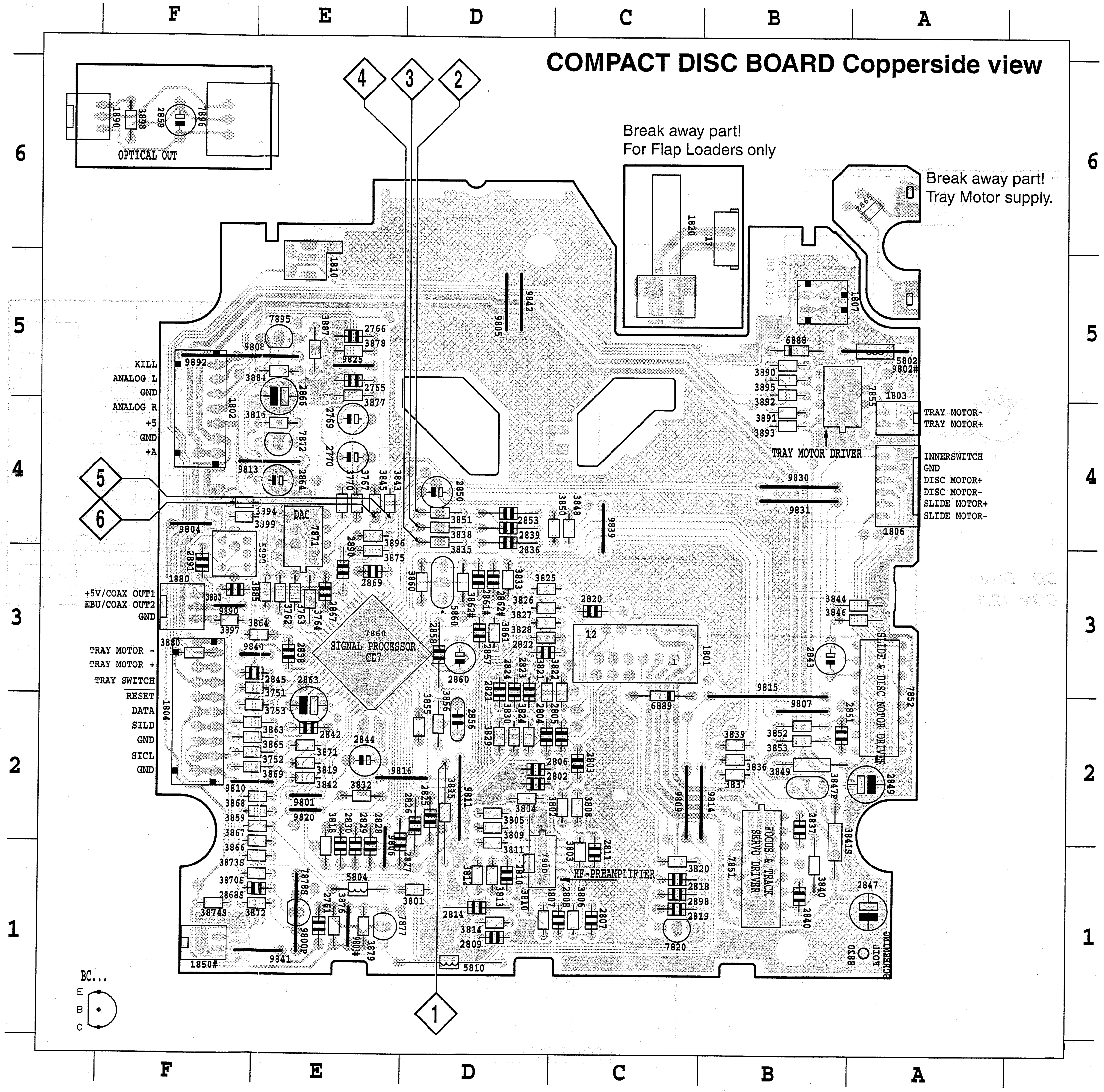
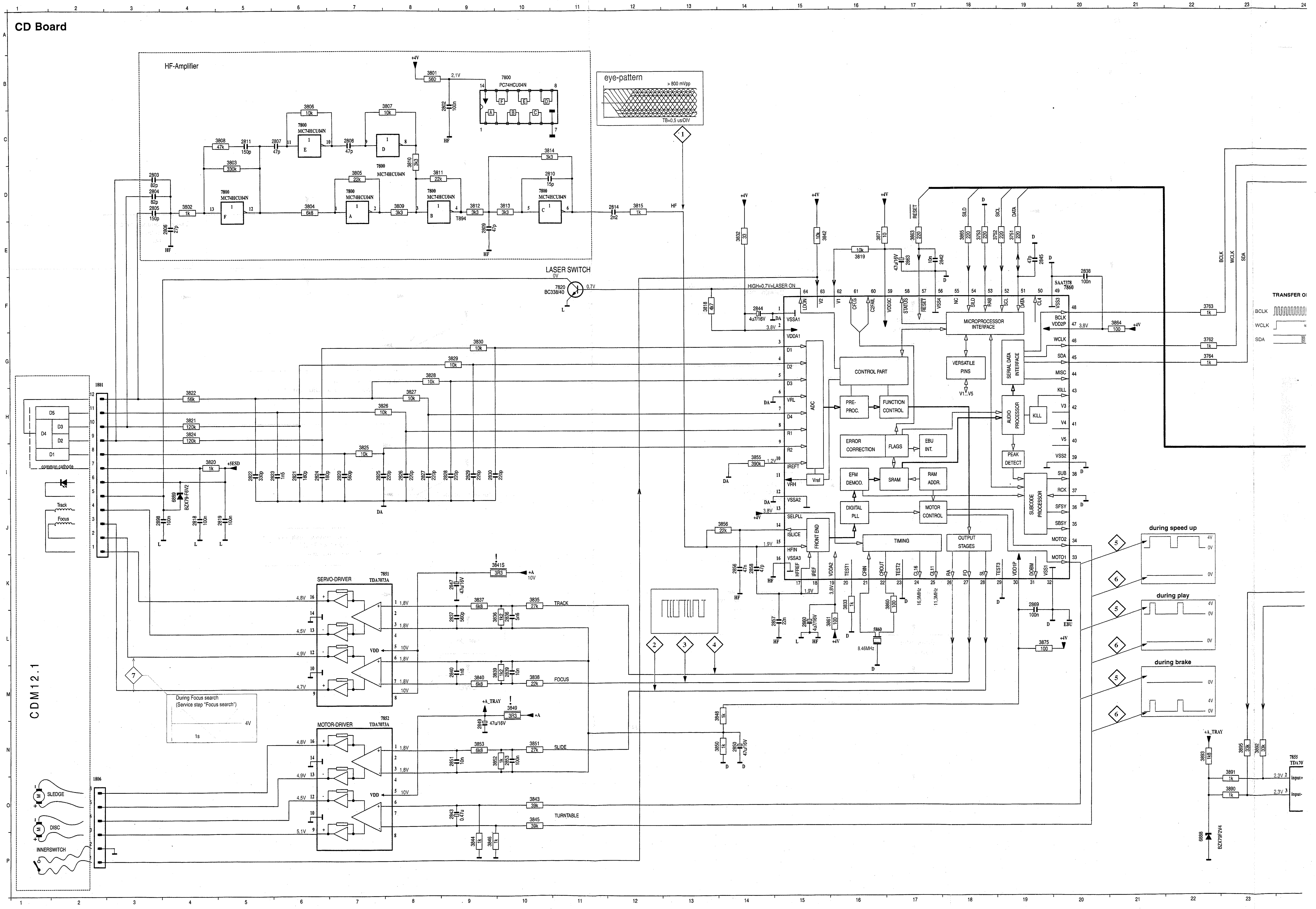
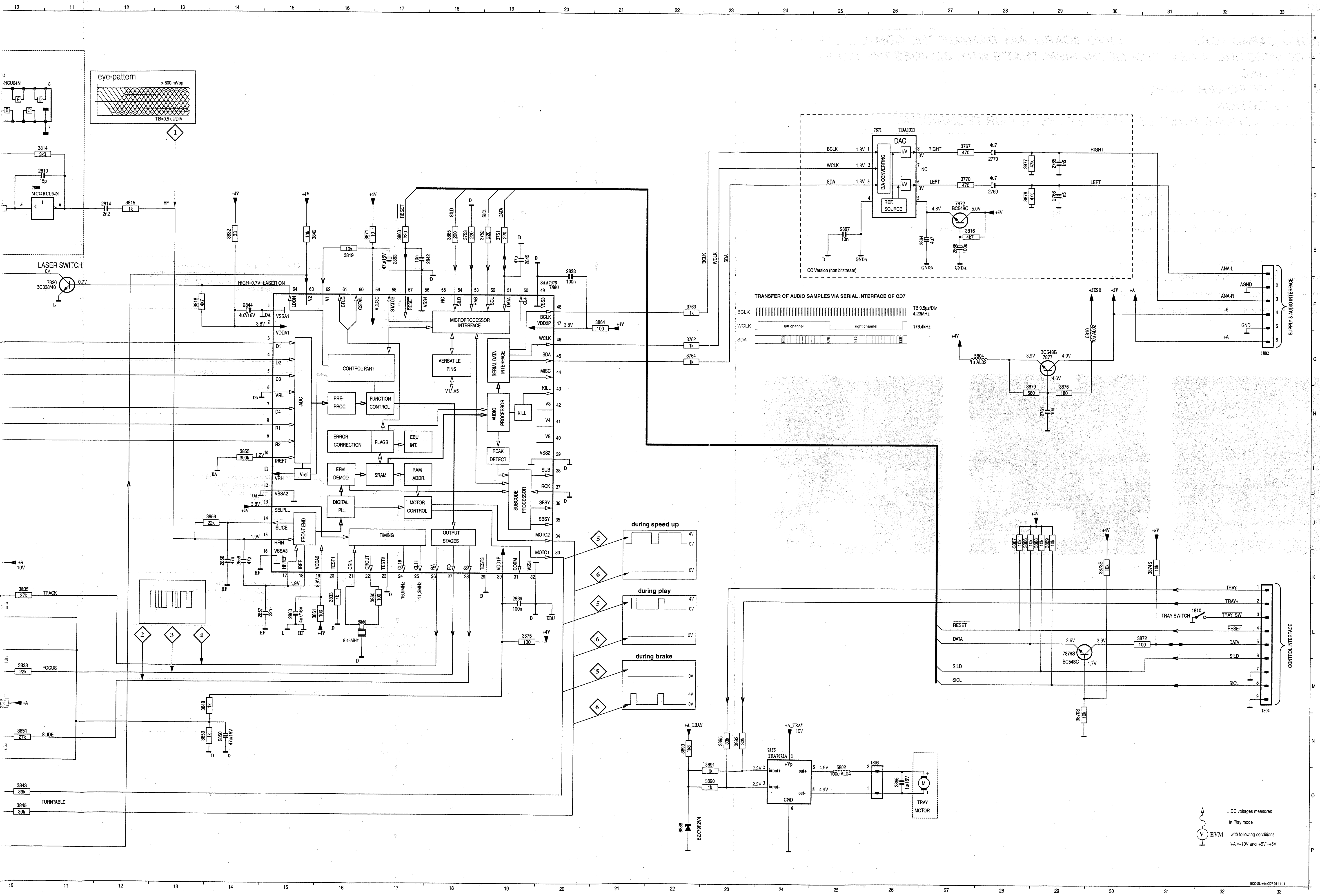
## COMPACT DISC BOARD Copperside view


F
E
D
C
B
A
1
2
3
4
5
6
OPTICAL OUT
1890
3898
2859
7896
④
③
②
①
⑤
⑥
Break away part!
For Flap Loaders only
1820
17
Break away part!
Tray Motor supply.
2865
1807
1810
9805
9842
7895
3887
2766
3878
9808
9825
9892
KILL
ANALOG L
GND
ANALOG R
+5
GND
+A
1802
3884
3816
2866
2765
3877
2769
7872
2770
9813
2864
3770
3767
3845
3843
2850
3851
3838
3835
2853
2839
2836
3850
3848
9839
6888
3890
3895
3892
3891
3893
7855
5802
9802#
1803
TRAY MOTOR DRIVER
TRAY MOTOR-
TRAY MOTOR+
INNERSWITCH
GND
DISC MOTOR+
DISC MOTOR-
SLIDE MOTOR+
SLIDE MOTOR-
1806
9830
9831
9804
3394
3899
DAC
7871
2891
5890
2890
3896
3875
1880
+5V/COAX OUT1
EBU/COAX OUT2
GND
3885
3762
3763
3764
2867
2869
3860
5860
3862#
2861#
3861
2862#
3833
3825
3826
3827
3828
2822
2820
3844
3846
3880
3897
3864
9840
2838
7860
SIGNAL PROCESSOR
CD7
2858
2860
2857
2821
2824
2823
3822
2804
2805
12
1
1801
2843
SLIDE & DISC MOTOR DRIVER
7852
TRAY MOTOR -
TRAY MOTOR +
TRAY SWITCH
RESET
DATA
SILD
GND
SICL
GND
1804
2845
3751
3753
3863
3865
3752
3869
2863
2842
3871
3819
3842
2844
3855
3856
2856
3829
3830
6889
9815
9807
2851
3839
3852
3853
3836
3849
3837
3847P
2849
9810
3868
3859
3867
3866
3873S
3870S
2868S
3874S
3872
9801
9820
3832
9816
2826
2825
3818
2830
2829
2828
9806
2827
3815
9811
3805
3809
3811
3804
3802
3808
3803
2811
2806
2802
2803
9809
9814
FOCUS & TRACK SERVO DRIVER
7851
2837
3840
2840
3841S
2847
8820
SCREENING FOIL
7878S
2761
3876
5804
9803#
3879
7877
3801
2814
3814
2809
3812
2810
3813
3810
7800
2808
3807
3806
2807
HF-PREAMPLIFIER
3820
2818
2898
2819
7820
9800P
9841
1850#
5810
BC...
E
B
C

## CD Board


HF-Amplifier
7800
PC74HCU04N
MC74HCU04N
+4V
3801
560
2,1V
eye-pattern
> 800 mVpp
TB=0,5 us/DIV
LASER SWITCH
0V
7820
BC338/40
0,7V
HIGH=0,7V=LASER ON
SAA7378
7860
VSSA1
VDDA1
D1
D2
D3
VRL
D4
R1
R2
IREFT
VRH
VSSA2
SELPLL
ISLICE
HFIN
VSSA3
HFREF
IREF
VDDA2
TEST1
CRIN
CROUT
TEST2
CL16
CL11
RA
FO
SL
TEST3
VDD1P
DOBM
VSS1
LDON
V2
V1
CFLG
C2FAIL
VDD3C
STATUS
RESET
VSS4
NC
SILD
RAB
SCL
DATA
CL4
VSS3
BCLK
VDD2P
WCLK
SDA
MISC
KILL
V3
V4
V5
VSS2
SUB
RCK
SFSY
SBSY
MOTO2
MOTO1
ADC
Vref
CONTROL PART
PRE-PROC.
FUNCTION CONTROL
ERROR CORRECTION
FLAGS
EBU INT.
EFM DEMOD.
SRAM
RAM ADDR.
DIGITAL PLL
MOTOR CONTROL
FRONT END
TIMING
OUTPUT STAGES
MICROPROCESSOR INTERFACE
VERSATILE PINS
V1...V5
SERIAL DATA INTERFACE
AUDIO PROCESSOR
KILL
PEAK DETECT
SUBCODE PROCESSOR
8,46MHz
16,9MHz
11,3MHz
5860
TRANSFER OF
BCLK
WCLK
SDA
during speed up
during play
during brake
4V
0V
1801
1806
D5
D3
D4
D2
D1
common cathode
Track
Focus
CDM12.1
SLEDGE
DISC
INNERSWITCH
+5ESD
BZX79-F6V2
6889
SERVO-DRIVER
7851
TDA7073A
MOTOR-DRIVER
7852
TDA7073A
VDD
TRACK
FOCUS
SLIDE
TURNTABLE
3841S
3R3
+A
10V
+A_TRAY
3849
3R3
47u/16V
During Focus search
(Service step "Focus search")
1s
4V
3893
1k8
6888
BZX79F2V4
3895
33k
3892
33k
3891
1k
3890
1k
2,3V
7855
TDA70
input+
input-
HF
DA
D
L
EBU


eye-pattern
> 800 mVpp
TB=0,5 us/DIV
LASER SWITCH
7820 BC338/40
HIGH=0,7V=LASER ON
7800 MC74HCU04N
3814 3k3
2810 15p
2814 2n2
3815 1k
HF
SAA7378 7860
MICROPROCESSOR INTERFACE
CONTROL PART
VERSATILE PINS
SERIAL DATA INTERFACE
ADC
PRE-PROC.
FUNCTION CONTROL
AUDIO PROCESSOR
KILL
ERROR CORRECTION
FLAGS
EBU INT.
PEAK DETECT
EFM DEMOD.
SRAM
RAM ADDR.
SUBCODE PROCESSOR
DIGITAL PLL
MOTOR CONTROL
FRONT END
TIMING
OUTPUT STAGES
Vref
VSSA1
VDDA1
D1
D2
D3
VRL
D4
R1
R2
IREFT
VRH
VSSA2
SELPLL
ISLICE
HFIN
VSSA3
HFREF
IREF
VDDA2
TEST1
CRIN
CROUT
TEST2
CL16
CL11
RA
FO
SL
TEST3
VDD1P
DOBM
VSS1
MOTO1
MOTO2
SBSY
SFSY
RCK
SUB
VSS2
V5
V4
V3
KILL
MISC
SDA
WCLK
BCLK
VDD2P
VSS3
CL4
DATA
SCL
RAB
SILD
NC
VSS4
RESET
STATUS
VDD3C
C2FAIL
CFLG
V1
V2
LDON
V1...V5
5860 8.46MHz
16.9MHz
11.3MHz
during speed up
during play
during brake
4V
0V
TRACK
FOCUS
SLIDE
TURNTABLE
3835 27k
3838 22k
3851 27k
3843 39k
3845 39k
+A 10V
7871 TDA1311
DAC
D/A CONVERTING
REF. SOURCE
I/V
BCLK
WCLK
SDA
RIGHT
LEFT
NC
3767 470
3770 470
4u7
2770
2769
3877 47k
3878 47k
2765 1n5
2766 1n5
7872 BC548C
3816 4k7
2867 10n
GNDA
CC Version (non bitstream)
TRANSFER OF AUDIO SAMPLES VIA SERIAL INTERFACE OF CD7
TB 0.5μs/Div
4.23MHz
left channel
right channel
176.4kHz
3763 1k
3762 1k
3764 1k
3864 100
ANA-L
AGND
ANA-R
+5
GND
+A
1802
SUPPLY & AUDIO INTERFACE
+5ESD
+5V
5804 1u AL02
5810 1u AL02
BC548B 7877
3879 560
3876 180
2761 10n
3867 10k
3866 10k
3868 10k
3869 10k
3873S 10k
3874S 10k
TRAY-
TRAY+
TRAY SWITCH
1810
TRAY_SW
RESET
DATA
SILD
SICL
7878S BC548C
3872 100
3870S 10k
1804
CONTROL INTERFACE
+A_TRAY
3893 1k8
3895 33k
3892 33k
3891 1k
3890 1k
6888 BZX79F2V4
7855 TDA7072A
+Vp
input+
input-
out+
out-
GND
5802 100u AL04
1803
2865 1u/16V
TRAY MOTOR
DC voltages measured in Play mode
EVM with following conditions '+A'=+10V and '+5V'=+5V
ECO SL with CD7 96-11-11

## WARNING

***CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CDM-ELECTRONICS WHEN CONNECTING A NEW CDM MECHANISM. THAT'S WHY, BESIDES THE SAFETY MEASURES LIKE***

- ***SWITCH OFF POWER SUPPLY***
- ***ESD PROTECTION***

***ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.***

The following steps have to be done when replacing the CDM mechanism:

1. Disconnect old CDM flexfoil from printed board
2. Connect paperclip to CDM flexfoil to short-circuit flexfoil (fig. 1)
3. Short-circuit printed board with brass-sheet (4822 321 11197) plugged into the flexfoil connector (fig. 2)
4. Remove old CDM mechanism
5. Position new CDM mechanism in its studs
6. Remove short-circuit from printed board connector
7. Remove shor-circuit from flexfoil of new CDM
8. Connect new flexfoil to print connector (fig. 3)

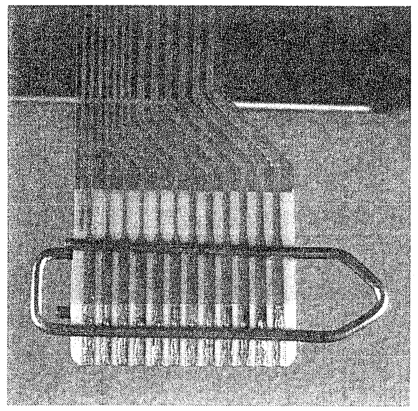


Fig. 1

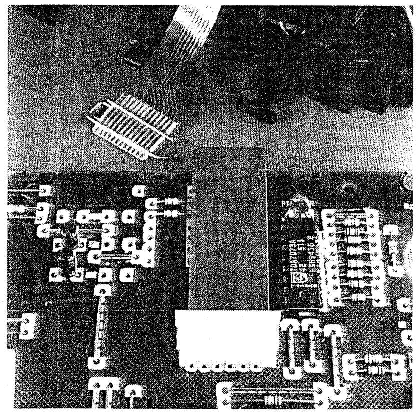


Fig. 2

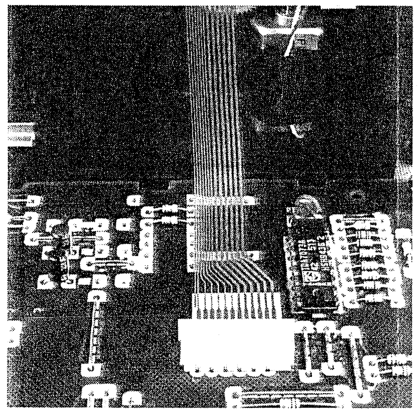
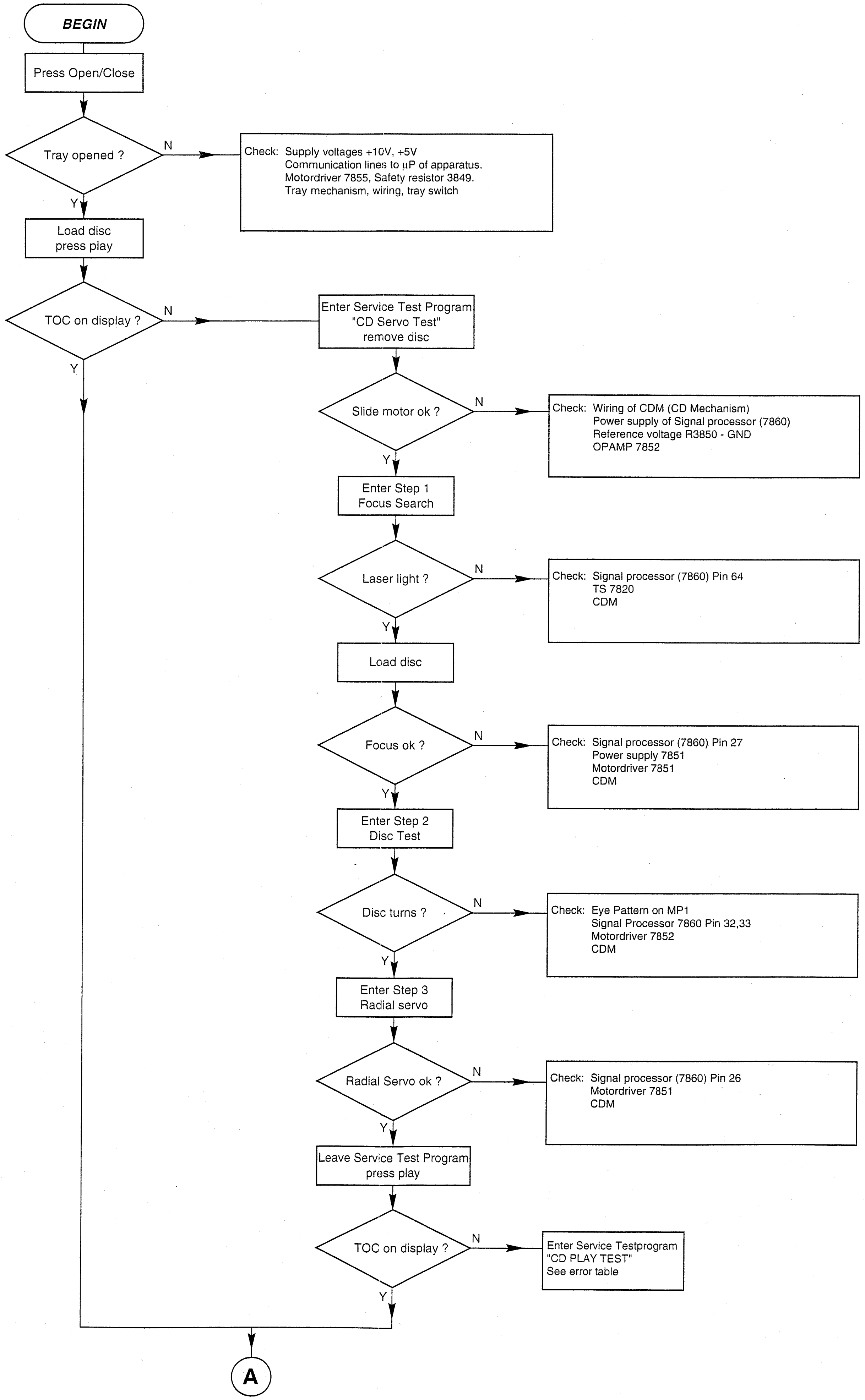
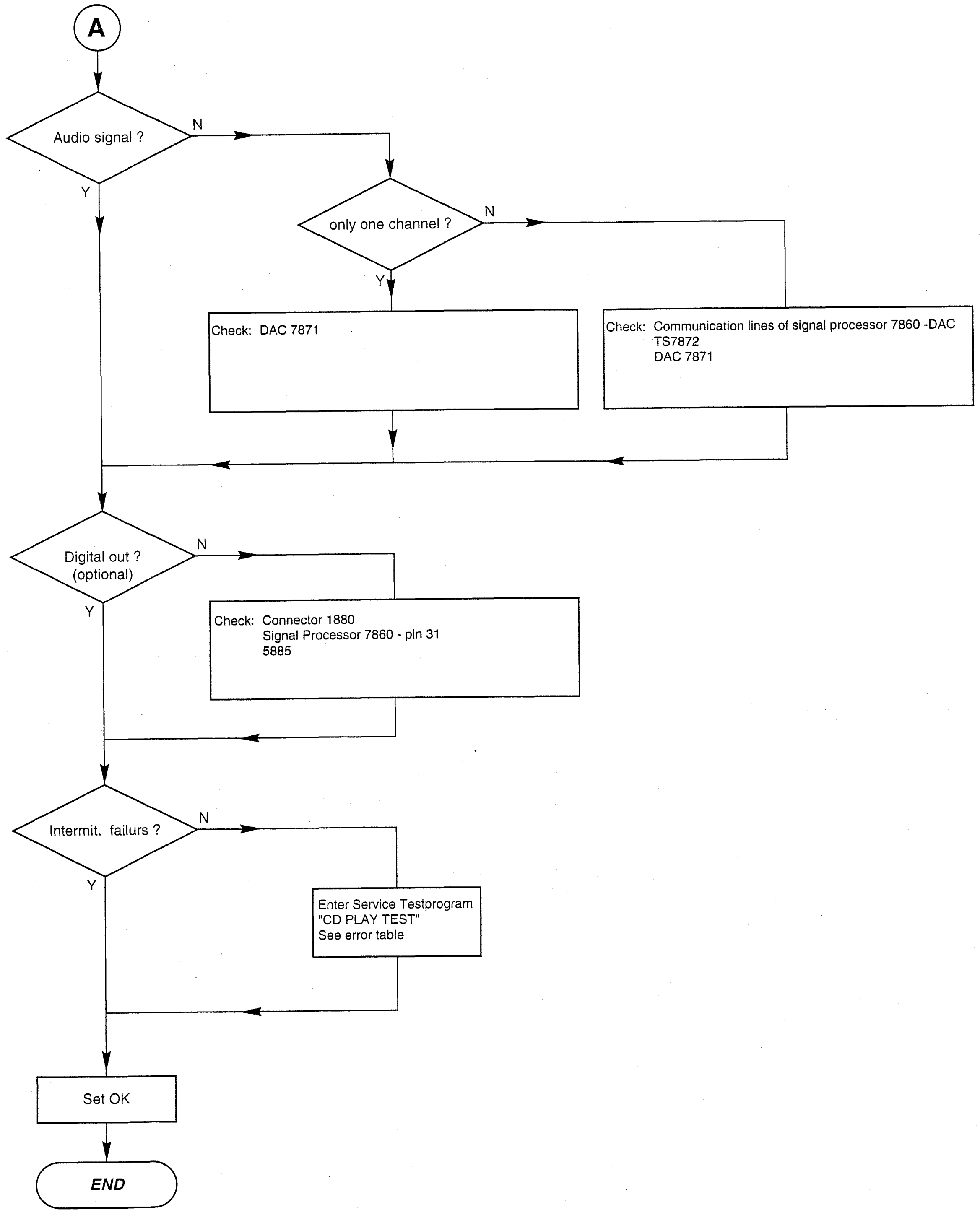
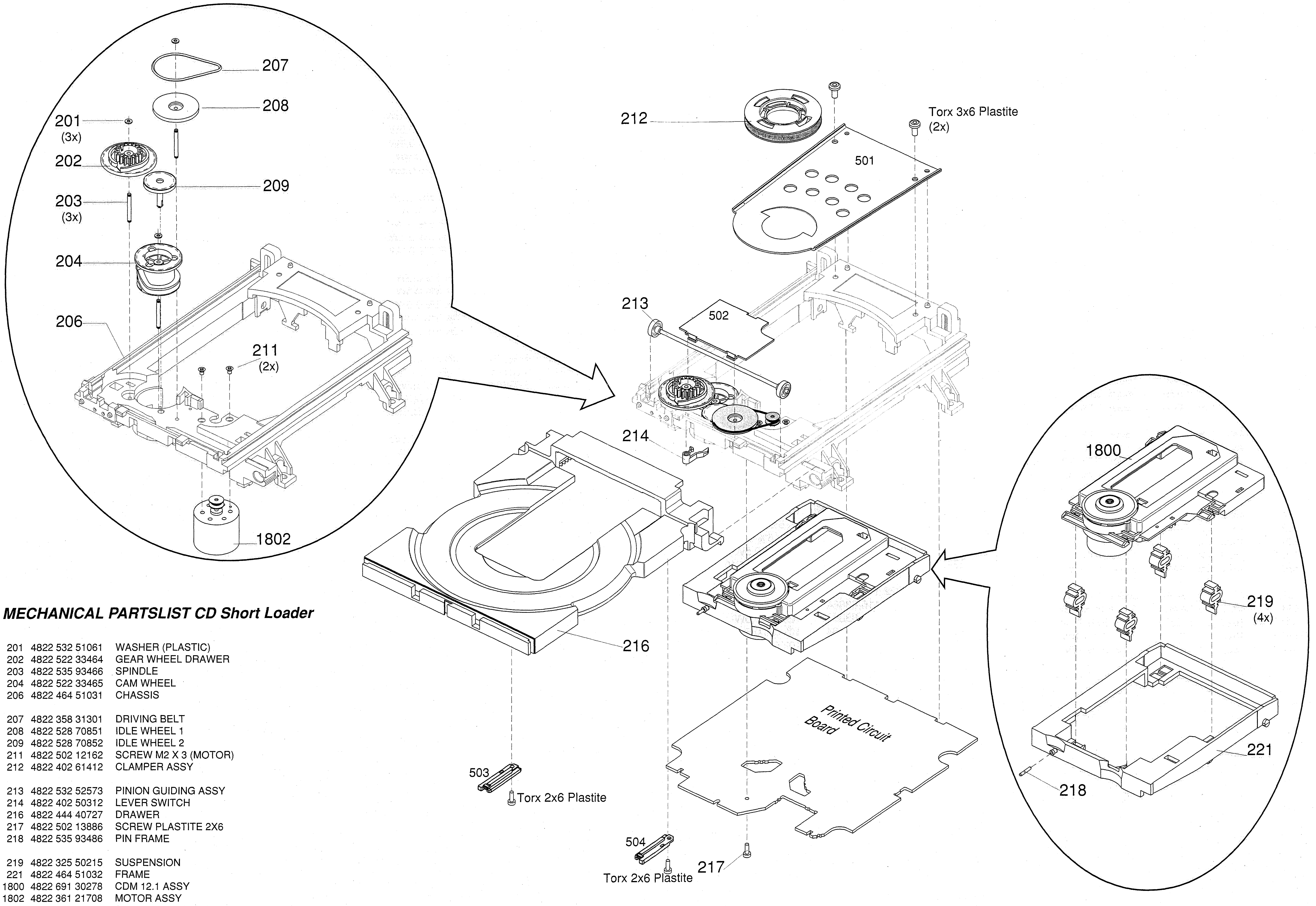


Fig. 3


BEGIN
Press Open/Close
Tray opened ?
N
Check: Supply voltages +10V, +5V
Communication lines to µP of apparatus.
Motordriver 7855, Safety resistor 3849.
Tray mechanism, wiring, tray switch
Y
Load disc
press play
TOC on display ?
N
Enter Service Test Program
"CD Servo Test"
remove disc
Y
Slide motor ok ?
N
Check: Wiring of CDM (CD Mechanism)
Power supply of Signal processor (7860)
Reference voltage R3850 - GND
OPAMP 7852
Y
Enter Step 1
Focus Search
Laser light ?
N
Check: Signal processor (7860) Pin 64
TS 7820
CDM
Y
Load disc
Focus ok ?
N
Check: Signal processor (7860) Pin 27
Power supply 7851
Motordriver 7851
CDM
Y
Enter Step 2
Disc Test
Disc turns ?
N
Check: Eye Pattern on MP1
Signal Processor 7860 Pin 32,33
Motordriver 7852
CDM
Y
Enter Step 3
Radial servo
Radial Servo ok ?
N
Check: Signal processor (7860) Pin 26
Motordriver 7851
CDM
Y
Leave Service Test Program
press play
TOC on display ?
N
Enter Service Testprogram
"CD PLAY TEST"
See error table
Y
A


A
Audio signal ?
N
Y
only one channel ?
N
Y
Check: DAC 7871
Check: Communication lines of signal processor 7860 -DAC
TS7872
DAC 7871
Digital out ?
(optional)
N
Y
Check: Connector 1880
Signal Processor 7860 - pin 31
5885
Intermit. failurs ?
N
Y
Enter Service Testprogram
"CD PLAY TEST"
See error table
Set OK
END

## Exploded view CD Short Loader


207
208
201
(3x)
202
209
203
(3x)
204
206
211
(2x)
1802
212
Torx 3x6 Plastite
(2x)
501
213
502
214
216
1800
219
(4x)
221
218
Printed Circuit Board
503
Torx 2x6 Plastite
504
Torx 2x6 Plastite
217

## MECHANICAL PARTSLIST CD Short Loader

| | | |
|---|---|---|
| 201 | 4822 532 51061 | WASHER (PLASTIC) |
| 202 | 4822 522 33464 | GEAR WHEEL DRAWER |
| 203 | 4822 535 93466 | SPINDLE |
| 204 | 4822 522 33465 | CAM WHEEL |
| 206 | 4822 464 51031 | CHASSIS |
| 207 | 4822 358 31301 | DRIVING BELT |
| 208 | 4822 528 70851 | IDLE WHEEL 1 |
| 209 | 4822 528 70852 | IDLE WHEEL 2 |
| 211 | 4822 502 12162 | SCREW M2 X 3 (MOTOR) |
| 212 | 4822 402 61412 | CLAMPER ASSY |
| 213 | 4822 532 52573 | PINION GUIDING ASSY |
| 214 | 4822 402 50312 | LEVER SWITCH |
| 216 | 4822 444 40727 | DRAWER |
| 217 | 4822 502 13886 | SCREW PLASTITE 2X6 |
| 218 | 4822 535 93486 | PIN FRAME |
| 219 | 4822 325 50215 | SUSPENSION |
| 221 | 4822 464 51032 | FRAME |
| 1800 | 4822 691 30278 | CDM 12.1 ASSY |
| 1802 | 4822 361 21708 | MOTOR ASSY |
| | 4822 502 30735 | SCREW 3 X 6 PLASTITE |

## *ELECTRICAL PARTS LIST - CD BOARD*

### MISCELLANEOUS

| | | |
|---|---|---|
| 1801 | 4822 267 51453 | Flex foil connector 12 pin |
| 1804 | 5322 265 40945 | Connector 9pin |
| 1810 | 4822 276 13503 | Tray Switch |

### CAPACITORS

| | | |
|---|---|---|
| 2761 | 4822 121 51387 | 10nF 20% 16V |
| 2765 | 4822 126 12878 | 1,5nF 10% 16V |
| 2766 | 4822 126 12878 | 1,5nF 10% 16V |
| 2769 | 4822 124 41969 | 1µF 20% 50V |
| 2770 | 4822 124 23401 | 4,7µF 20% 25V |
| 2802 | 4822 126 12882 | 100nF 20% 50V |
| 2803 | 4822 122 10319 | 82pF 5% 50V |
| 2804 | 4822 122 10319 | 82pF 5% 50V |
| 2805 | 4822 122 33849 | 150pF 10% 50V |
| 2806 | 4822 122 33192 | 27pF 5% 50V |
| 2807 | 4822 122 33848 | 47pF 5% 50V |
| 2808 | 4822 122 33848 | 47pF 5% 50V |
| 2809 | 4822 122 33848 | 47pF 5% 50V |
| 2810 | 4822 122 10462 | 15pF 5% 50V |
| 2811 | 4822 122 33849 | 150pF 10% 50V |
| 2814 | 4822 126 12339 | 2,2nF 10% 16V |
| 2818 | 4822 126 12882 | 100nF 20% 50V |
| 2819 | 4822 126 12882 | 100nF 20% 50V |
| 2820 | 4822 122 10459 | 560pF 10% 50V |
| 2821 | 4822 126 10053 | 180pF 10% 50V |
| 2822 | 4822 126 12787 | 330pF 10% 50V |
| 2823 | 4822 126 12878 | 1,5nF 10% 16V |
| 2824 | 4822 126 10053 | 180pF 10% 50V |
| 2825 | 4822 122 10466 | 220pF 10% 50V |
| 2826 | 4822 122 10466 | 220pF 10% 50V |
| 2827 | 4822 122 10466 | 220pF 10% 50V |
| 2828 | 4822 122 10466 | 220pF 10% 50V |
| 2829 | 4822 122 10466 | 220pF 10% 50V |
| 2830 | 4822 122 10466 | 220pF 10% 50V |
| 2836 | 4822 126 13098 | 5,6nF 20% 16V |
| 2837 | 4822 122 10459 | 560pF 10% 50V |
| 2838 | 4822 126 12882 | 100nF 20% 50V |
| 2839 | 4822 121 51387 | 10nF 20% 16V |
| 2840 | 4822 122 10576 | 1,8nF 10% 16V |
| 2842 | 4822 121 51387 | 10nF 20% 16V |
| 2843 | 5322 124 41948 | 0,47µF 20% 50V |
| 2844 | 4822 124 23401 | 4,7µF 20% 25V |
| 2845 | 4822 122 33848 | 47pF 5% 50V |
| 2847 | 4822 124 40433 | 47µF 20% 25V |
| 2849 | 4822 124 40433 | 47µF 20% 25V |
| 2850 | 4822 124 23178 | 47µF 20% 16V |
| 2851 | 4822 121 51387 | 10nF 20% 16V |
| 2853 | 4822 126 12882 | 100nF 20% 50V |
| 2856 | 4822 121 43526 | 47nF 5% 100V |
| 2857 | 4822 126 11585 | 22nF 20% 50V |
| 2858 | 4822 122 33848 | 47pF 5% 50V |
| 2860 | 4822 124 23401 | 4.7µF 20% 25V |
| 2863 | 4822 124 23178 | 47µF 20% 16V |
| 2864 | 4822 124 23401 | 4.7µF 20% 25V |
| 2866 | 4822 124 23264 | 100µF 20% 6,3V |
| 2898 | 4822 121 51387 | 10nF 10% 16V |
| 2869 | 4822 126 12882 | 100nF 20% 50V |
| 2898 | 4822 126 12882 | 100nF 20% 50V |

### RESISTORS

| | | |
|---|---|---|
| 3751 | 4822 116 83872 | 220R 5% 0,5W |
| 3752 | 4822 116 83872 | 220R 5% 0,5W |
| 3753 | 4822 116 83872 | 220R 5% 0,5W |
| 3762 | 4822 050 11002 | 1K 5% 0,2W |
| 3763 | 4822 050 11002 | 1K 5% 0,2W |
| 3764 | 4822 050 11002 | 1K 5% 0,2W |
| 3767 | 4822 116 52224 | 470R 5% 0,5W |
| 3770 | 4822 116 52224 | 470R 5% 0,5W |
| 3801 | 4822 116 52226 | 560R 5% 0,5W |
| 3802 | 4822 050 11002 | 1K 5% 0,2W |
| 3803 | 4822 116 52272 | 330K 5% 0,5W |
| 3804 | 4822 116 83961 | 6,8K 5% 0,16W |
| 3805 | 4822 116 52257 | 22K 5% 0,5W |
| 3806 | 4822 116 83864 | 10K 5% 0,5W |
| 3807 | 4822 116 83864 | 10K 5% 0,5W |
| 3808 | 4822 116 52284 | 47K 5% 0,5W |
| 3809 | 4822 116 52269 | 3,3K 5% 0,5W |
| 3810 | 4822 116 52269 | 3,3K 5% 0,5W |
| 3811 | 4822 116 52257 | 22K 5% 0,5W |
| 3812 | 4822 116 52269 | 3,3K 5% 0,5W |
| 3813 | 4822 116 52269 | 3,3K 5% 0,5W |
| 3814 | 4822 116 52269 | 3,3K 5% 0,5W |
| 3815 | 4822 050 11002 | 1K 5% 0,2W |
| 3816 | 4822 116 52283 | 4,7K 5% 0,5W |
| 3818 | 4822 116 52283 | 4,7K 5% 0,5W |
| 3819 | 4822 116 83868 | 150R 5% 0,5W |
| 3820 | 4822 050 11002 | 1K 5% 0,2W |
| 3821 | 4822 116 52239 | 120k 5% 0,5W |
| 3822 | 4822 116 52291 | 56k 5% 0,5W |
| 3824 | 4822 116 52239 | 120k 5% 0,5W |
| 3825 | 4822 116 83864 | 10k 5% 0,5W |
| 3826 | 4822 116 83864 | 10k 5% 0,5W |
| 3827 | 4822 116 83864 | 10k 5% 0,5W |
| 3828 | 4822 116 83864 | 10k 5% 0,5W |
| 3829 | 4822 116 83864 | 10k 5% 0,5W |
| 3830 | 4822 116 83864 | 10k 5% 0,5W |
| 3832 | 4822 116 52191 | 33R 5% 0,5W |
| 3833 | 4822 050 11002 | 1K 5% 0,2W |
| 3835 | 4822 116 52264 | 27K 5% 0,5W |
| 3836 | 4822 116 52207 | 1,2K 5% 0,5W |
| 3837 | 4822 116 83961 | 6,8K 5% 0,16W |
| 3838 | 4822 116 52257 | 22K 5% 0,5W |
| 3839 | 4822 116 52207 | 1,2K 5% 0,5W |
| 3840 | 4822 116 83961 | 6,8K 5% 0,16W |
| 3841 | 4822 052 10338 | 3,3R NFR25 |
| 3842 | 4822 116 83864 | 10K 5% 0,5W |
| 3843 | 4822 116 83882 | 39K 5% 0,5W |
| 3844 | 4822 050 11002 | 1K 5% 0,2W |
| 3845 | 4822 116 83882 | 39K 5% 0,5W |
| 3846 | 4822 050 11002 | 1K 5% 0,2W |
| 3848 | 4822 050 11002 | 1K 5% 0,2W |
| 3849 | 4822 052 10338 | 3,3R NFR25 |
| 3850 | 4822 050 11002 | 1K 5% 0,2W |
| 3851 | 4822 116 52264 | 27K 5% 0,5W |
| 3852 | 4822 050 11002 | 1K 5% 0,2W |
| 3853 | 4822 116 83961 | 6,8K 5% 0,16W |
| 3855 | 4822 116 52278 | 390K 5% 0,5W |
| 3856 | 4822 051 20154 | 150K 5% 0,5W |
| 3859 | 4822 116 52257 | 22K 5% 0,5W |
| 3860 | 4822 116 52175 | 100R 5% 0,5W |
| 3861 | 4822 116 52175 | 100R 5% 0,5W |
| 3862 | 4822 116 52235 | 1M 5% 0,5W |
| 3863 | 4822 116 83872 | 220R 5% 0,5W |
| 3864 | 4822 116 52175 | 100R 5% 0,5W |
| 3865 | 4822 116 83872 | 220R 5% 0,5W |
| 3866 | 4822 116 83864 | 10K 5% 0,5W |
| 3867 | 4822 116 83864 | 10K 5% 0,5W |
| 3868 | 4822 116 83864 | 10K 5% 0,5W |
| 3869 | 4822 116 83864 | 10K 5% 0,5W |
| 3870 | 4822 116 83864 | 10K 5% 0,5W |
| 3871 | 4822 116 52176 | 10R 5% 0,5W |
| 3872 | 4822 116 52175 | 100R 5% 0,5W |
| 3873 | 4822 116 83864 | 10K 5% 0,5W |
| 3874 | 4822 116 83864 | 10K 5% 0,5W |
| 3875 | 4822 116 52175 | 100R 5% 0,5W |
| 3876 | 4822 116 52213 | 180R 5% 0,5W |
| 3877 | 4822 116 52284 | 47K 5% 0,5W |
| 3878 | 4822 116 52284 | 47K 5% 0,5W |
| 3879 | 4822 116 52226 | 560R 5% 0,5W |
| 3890 | 4822 050 11002 | 1K 5% 0,2W |
| 3891 | 4822 050 11002 | 1K 5% 0,2W |
| 3892 | 4822 116 52271 | 33K 5% 0,16W |
| 3893 | 4822 116 52249 | 1,8K 5% 0,16W |
| 3895 | 4822 116 52271 | 33K 5% 0,16W |

## *ELECTRICAL PARTS LIST - CD BOARD*

### COILS

| | | |
|---|---|---|
| 5804 | 4822 157 53302 | 1µH |
| 5810 | 4822 152 20677 | 10µH |
| 5860 | 4822 242 73557 | Ceramic Res. 8,46MHz |

### DIODES

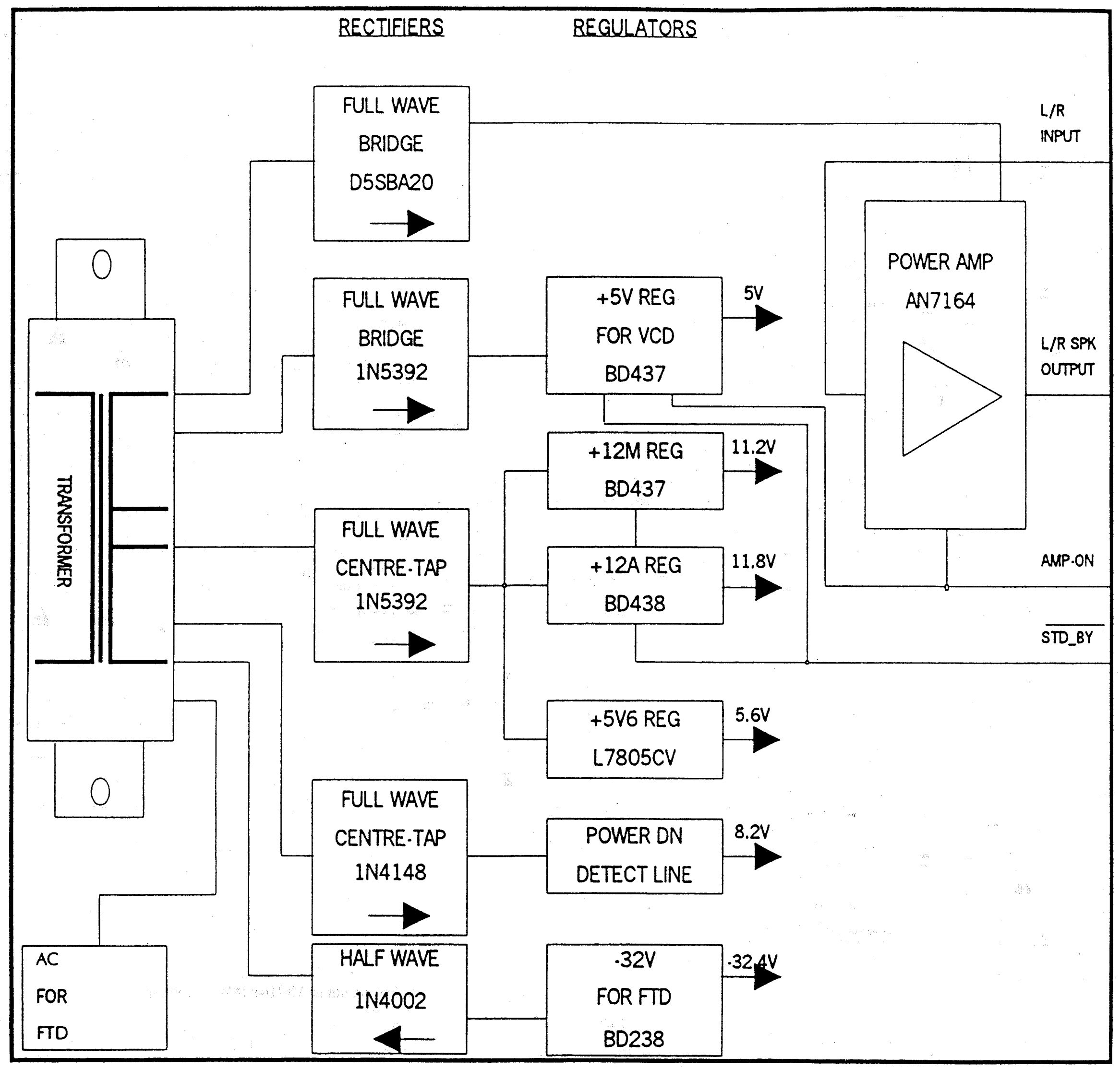
| | | |
|---|---|---|
| 6888 | 4822 130 80655 | BZX79-F2V4 |
| 6889 | 4822 130 34167 | BZX79-B6V2 |

### TRANSISTORS

| | | |
|---|---|---|
| 7820 | 5322 209 11517 | PC74HCU04T |
| 7851 | 4822 209 32852 | TDA7073A/N2 |
| 7852 | 4822 209 32852 | TDA7073A/N2 |
| 7855 | 4822 209 31519 | TDA7072A |
| 7860 | 4822 209 12752 | SAA7378GP |
| 7871 | 4822 209 32421 | TDA1311A/N2 |

Note : Only the parts mentioned in this list are normal service spare parts.

# POWER BOARD


RECTIFIERS
REGULATORS
FULL WAVE BRIDGE D5SBA20
FULL WAVE BRIDGE 1N5392
FULL WAVE CENTRE-TAP 1N5392
FULL WAVE CENTRE-TAP 1N4148
HALF WAVE 1N4002
+5V REG FOR VCD BD437
5V
+12M REG BD437
11.2V
+12A REG BD438
11.8V
+5V6 REG L7805CV
5.6V
POWER DN DETECT LINE
8.2V
-32V FOR FTD BD238
-32.4V
POWER AMP AN7164
L/R INPUT
L/R SPK OUTPUT
AMP-ON
STD_BY
TRANSFORMER
AC FOR FTD

***WARNING :*** *If the power amplifier heatsink is not attached to the power amplifier during testing, do not make the amplifier deliver more than 500mW per channel. It is advisable to inject signal one channel at a time whenever possible and to remove all input signal immediately after test.*

CONNECTOR 12 TO 1210

| | | | |
|---|---|---|---|
| o | 1 | PA | AC input to power amplifier rectifier |
| o | 2 | PA | AC input to power amplifier rectifier *[Note:Pin1 is shorted to Pin 2]* |
| o | 3 | PA | AC input to power amplifier rectifier |
| o | 4 | PA | AC input to power amplifier rectifier *[Note:Pin 3 is shorted to Pin 4]* |
| o | 5 | +12V/+5V6 | AC input to +12V & +5V6 rectifier |
| o | 6 | GND | Centre-tap of secondary winding of Pin 5 ,7 and 8 |
| o | 7 | +12V/+5V6 | AC input to +12V & +5V6 rectifier |
| o | 8 | -35V | AC input to FTD rectifier |
| o | 9 | FTD | FTD filament voltage |
| o | 10 | FTD | FTD filament voltage |

CONNECTOR 1222 — FTD SUPPLY AND uP CONTROL SIGNALS

| | | | |
|---|---|---|---|
| o | 1 | STDBY | Standby signal from microprocessor |
| o | 2 | ~F1 | AC voltage for FTD filament |
| o | 3 | ~F2 | AC voltage for FTD filament |
| o | 4 | -32V | -32.4V voltage for FTD grid |
| o | 5 | $\overline{\text{PWD DN}}$ | Power down signal to microprocessor |

CONNECTOR 1223 — AF SIGNAL AND SUPPLY

| | | | |
|---|---|---|---|
| o | 1 | L | Left input for power amplifier |
| o | 2 | ⊥ a | AF ground |
| o | 3 | R | Right input for power amplifier |
| o | 4 | AMP_ON | Control from up to switch power amplifier and VCD regulator to standby |
| o | 5 | +12M | +12V for tapedeck motors and CD mechanisms |
| o | 6 | ⊥ B | Ground for +12A |
| o | 7 | +12A | +12V for analog circuitries |
| o | 8 | ⊥ D | Motor and Digital ground |
| o | 9 | +5V6 | +5V6 for set uP and VCD uP |

CONNECTOR 1224 — AF SIGNAL AND SUPPLY *[OPTION]*

*[Connections as 1223 but with digital ground and motor ground seperated]*

| | | | |
|---|---|---|---|
| o | 1 | L | Left input for power amplifier |
| o | 2 | ⊥ a | AF ground |
| o | 3 | R | Right input for power amplifier |
| o | 4 | AMP_ON | Control from uP to switch power amplifier and VCD regulator to standby |
| o | 5 | +12A | +12V for analog circuitries |
| o | 6 | ⊥ B | Ground for +12A |
| o | 7 | +12M | +12V for tapedeck motors and CD mechanisms |
| o | 8 | ⊥ M | Motor ground |
| o | 9 | +5V6 | +5V6 for set up and VCD up |
| o | 10 | ⊥ D | Digital ground |

CONNECTOR 1237 — VCD SUPPLY *[OPTION]*

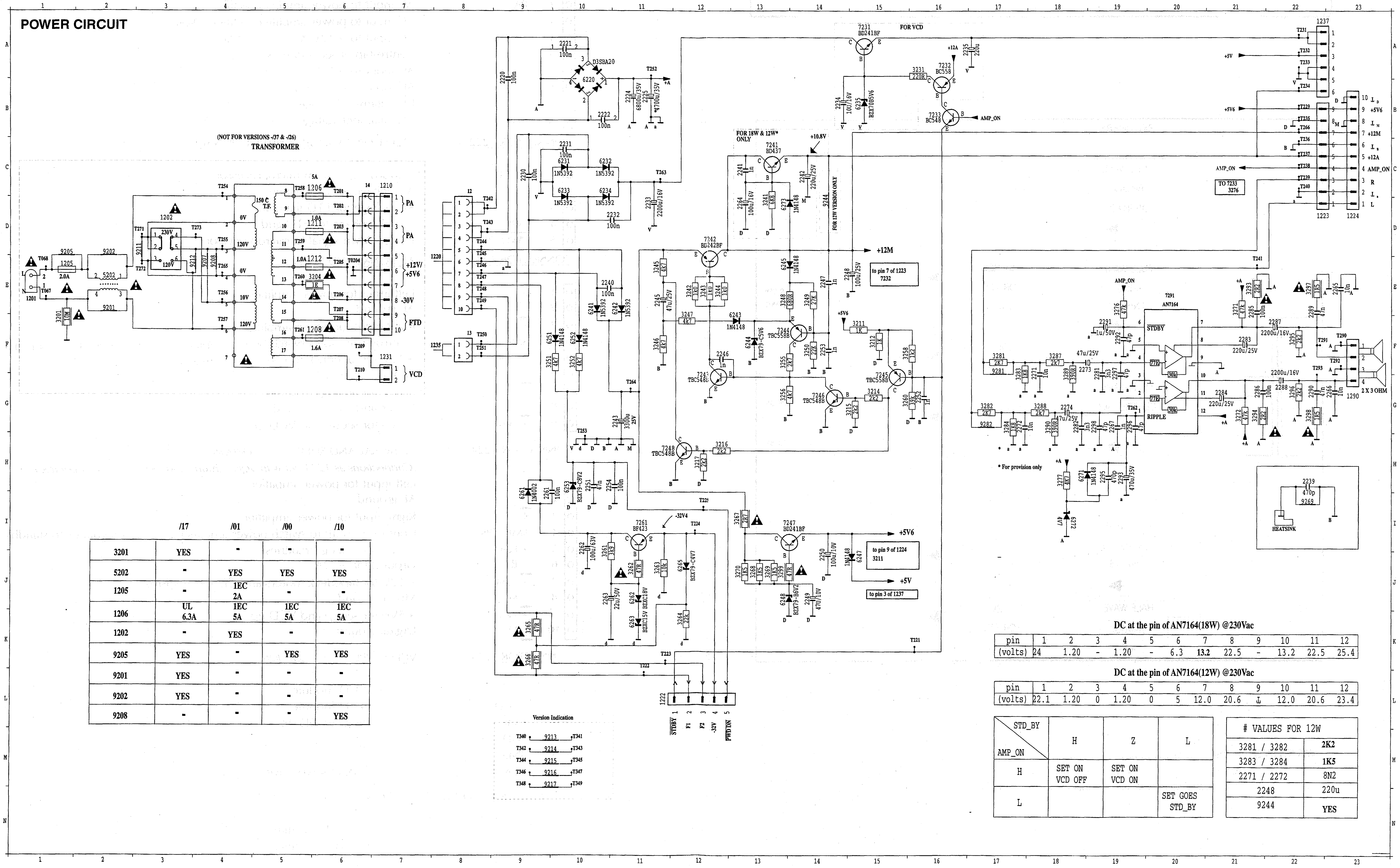
| | | | |
|---|---|---|---|
| o | 1 | +VCD | +5V for VCD module |
| o | 2 | +VCD | +5V for VCD module |
| o | 3 | +Vsl | +5V for VCD uP-SRAM |
| o | 4 | GND | Ground |
| o | 5 | GND | Ground |
| o | 6 | +VA | +12V for VCD servo drivers |

CONNECTOR 13 TO 1231 *[OPTION]*

| | | | |
|---|---|---|---|
| o | 1 | VCD | AC input to VCD rectifier |
| o | 2 | VCD | AC input to VCD rectifier |

| | |
|---|---|
| 12 | C 8 |
| 1201 | E 1 |
| 1202 | D 3 |
| 1205 | E 1 |
| 1206 | C 6 |
| 1208 | F 6 |
| 1210 | C 7 |
| 1211 | D 6 |
| 1212 | E 6 |
| 1222 | L11 |
| 1223 | D22 |
| 1224 | D23 |
| 1231 | F 7 |
| 1237 | A22 |
| 1290 | G23 |
| 13 | F 8 |
| 14 | C 6 |
| 2220 | A 9 |
| 2221 | A10 |
| 2222 | B10 |
| 2224 | B11 |
| 2225 | B11 |
| 2230 | C 9 |
| 2231 | C10 |
| 2232 | D11 |
| 2233 | D11 |
| 2234 | B14 |
| 2235 | A16 |
| 2239 | H22 |
| 2240 | E10 |
| 2241 | C13 |
| 2242 | C14 |
| 2243 | G11 |
| 2245 | E11 |
| 2246 | F12 |
| 2247 | E14 |
| 2248 | E14 |
| 2249 | J14 |
| 2250 | J14 |
| 2251 | H10 |
| 2252 | G16 |
| 2253 | F14 |
| 2254 | H10 |
| 2261 | I 9 |
| 2262 | I10 |
| 2263 | J10 |
| 2264 | D13 |
| 2265 | E23 |
| 2266 | G23 |
| 2267 | G19 |
| 2271 | F18 |
| 2272 | G17 |
| 2273 | F18 |
| 2274 | G18 |
| 2281 | F19 |
| 2282 | G18 |
| 2283 | F21 |
| 2284 | G21 |
| 2285 | E21 |
| 2286 | G21 |
| 2287 | F22 |
| 2288 | G22 |
| 2289 | E22 |
| 2290 | G22 |
| 2291 | F19 |
| 2292 | F19 |
| 2293 | H19 |
| 2295 | H19 |
| 2296 | G19 |
| 2297 | F19 |
| 2298 | G19 |
| 3201 | F 1 |
| 3204 | E 6 |
| 3211 | F15 |
| 3212 | F15 |
| 3214 | G15 |
| 3215 | G15 |
| 3216 | H12 |
| 3217 | H12 |
| 3231 | A16 |
| 3241 | D13 |
| 3242 | E12 |
| 3243 | E12 |
| 3244 | E12 |
| 3245 | E11 |
| 3246 | F11 |
| 3247 | F12 |
| 3248 | E13 |
| 3249 | E14 |
| 3250 | F14 |
| 3251 | F 9 |
| 3252 | F10 |
| 3255 | F13 |
| 3256 | G13 |
| 3258 | F15 |
| 3260 | G15 |
| 3261 | I10 |
| 3262 | J11 |
| 3263 | J11 |
| 3264 | K12 |
| 3265 | K 9 |
| 3266 | K 9 |
| 3267 | I13 |
| 3268 | J13 |
| 3269 | J13 |
| 3270 | J13 |
| 3271 | E21 |
| 3272 | G21 |
| 3276 | E19 |
| 3277 | H18 |
| 3281 | F17 |
| 3282 | G17 |
| 3283 | F17 |
| 3284 | G17 |
| 3287 | F18 |
| 3288 | G18 |
| 3289 | F18 |
| 3290 | G18 |
| 3293 | E21 |
| 3294 | G21 |
| 3295 | F22 |
| 3296 | G22 |
| 3297 | E22 |
| 3298 | G22 |
| 3299 | J13 |
| 5202 | E 2 |
| 6220 | A10 |
| 6231 | C10 |
| 6232 | C10 |
| 6233 | C10 |
| 6234 | C10 |
| 6235 | B15 |
| 6241 | E10 |
| 6242 | E11 |
| 6243 | F13 |
| 6244 | F13 |
| 6245 | E13 |
| 6247 | J15 |
| 6248 | J13 |
| 6251 | F 9 |
| 6252 | F10 |
| 6253 | H10 |
| 6261 | I 9 |
| 6262 | J11 |
| 6263 | K11 |
| 6265 | J12 |
| 6271 | H18 |
| 6272 | I18 |
| 6273 | D13 |
| 7231 | A15 |
| 7232 | A16 |
| 7233 | B16 |
| 7241 | C13 |
| 7242 | D12 |
| 7243 | G12 |
| 7244 | F13 |
| 7245 | G15 |
| 7246 | G14 |
| 7247 | I13 |
| 7248 | H12 |
| 7261 | I11 |
| 7291 | E20 |
| 9201 | E 2 |
| 9202 | D 2 |
| 9205 | D 1 |
| 9207 | E 4 |
| 9208 | E 4 |
| 9211 | D 3 |
| 9212 | E 3 |
| 9213 | M 9 |
| 9214 | M 9 |
| 9215 | M 9 |
| 9216 | M 9 |
| 9217 | M 9 |
| 9244 | D14 |
| 9269 | I22 |
| 9281 | F17 |
| 9282 | G17 |

## POWER CIRCUIT


(NOT FOR VERSIONS -/37 & -/26)
TRANSFORMER
1202
230V
120V
0V
120V
0V
10V
120V
150 C T.F.
5A
1206
1.0A
1211
1.0A 1212
1208
1.6A
1210
PA
PA
+12V/
+5V6
-30V
FTD
1231
VCD
1220
1235
1205
2.0A
9205
9202
5202
9201
3201
10M
D3SBA20
6220
2221
100n
2222
100n
2224
6800u/35V
2225
4700u/35V
T252
+A
2231
100n
6231
1N5392
6232
1N5392
6233
1N5392
6234
1N5392
2232
100n
2233
2200u/16V
T263
7231
BD241BF
FOR VCD
+12A
2235
220u
3231
220R
7232
BC558
7233
BC548
AMP_ON
2234
100u/16V
6235
BZX79B5V6
FOR 18W & 12W*
ONLY
7241
BD437
+10.8V
2242
220u/25V
FOR 12W VERSION ONLY
9244
7242
BD242BF
+12M
to pin 7 of 1223
7232
7244
TBC558B
7243
TBC548B
7245
TBC558B
7246
TBC548B
7248
TBC548B
7261
BF423
-32V4
7247
BD241BF
+5V6
to pin 9 of 1224
3211
+5V
to pin 3 of 1237
1222
STDBY
F1
F2
-32V
PWD DN
Version Indication
T340 9213 T341
T342 9214 T343
T344 9215 T345
T346 9216 T347
T348 9217 T349
1237
1223
1224
+5V
+5V6
10 L D
9 +5V6
8 L M
7 +12M
6 L A
5 +12A
4 AMP_ON
3 R
2 L
1 L
TO 7233
3276
7291
AN7164
STDBY
RIPPLE
2X3 OHM
1290
* For provision only
2239
470p
9269
HEATSINK

| | /17 | /01 | /00 | /10 |
|---|---|---|---|---|
| 3201 | YES | - | - | - |
| 5202 | - | YES | YES | YES |
| 1205 | - | 1EC<br>2A | - | - |
| 1206 | UL<br>6.3A | 1EC<br>5A | 1EC<br>5A | 1EC<br>5A |
| 1202 | - | YES | - | - |
| 9205 | YES | - | YES | YES |
| 9201 | YES | - | - | - |
| 9202 | YES | - | - | - |
| 9208 | - | - | - | YES |

**DC at the pin of AN7164(18W) @230Vac**

| pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (volts) | 24 | 1.20 | - | 1.20 | - | 6.3 | 13.2 | 22.5 | - | 13.2 | 22.5 | 25.4 |

**DC at the pin of AN7164(12W) @230Vac**

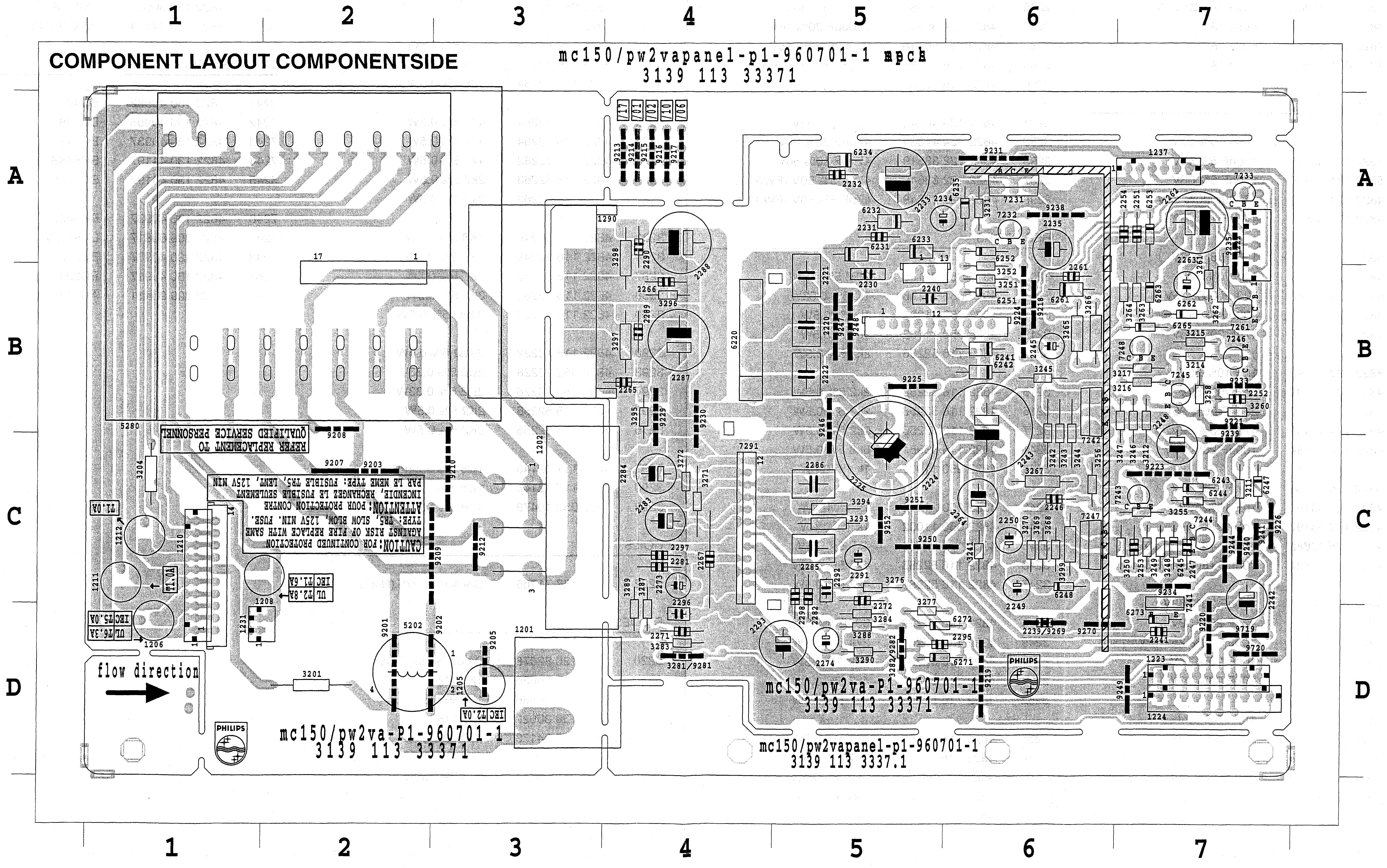
| pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (volts) | 22.1 | 1.20 | 0 | 1.20 | 0 | 5 | 12.0 | 20.6 | L | 12.0 | 20.6 | 23.4 |

| STD_BY / AMP_ON | H | Z | L |
|---|---|---|---|
| H | SET ON<br>VCD OFF | SET ON<br>VCD ON | |
| L | | | SET GOES<br>STD_BY |

| # VALUES FOR 12W | |
|---|---|
| 3281 / 3282 | 2K2 |
| 3283 / 3284 | 1K5 |
| 2271 / 2272 | 8N2 |
| 2248 | 220u |
| 9244 | YES |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 B 5 | 1223 D 7 | 2232 A 5 | 2248 C 7 | 2266 B 4 | 2287 B 4 | 3204 C 1 | 3245 B 6 | 3261 B 7 | 3276 C 5 | 3295 B 4 | 6235 A 6 | 6262 B 7 | 7244 C 7 | 9208 B 2 | 9221 B 7 | 9239 C 7 | 9270 D 6 |
| 13 B 5 | 1224 D 7 | 2233 A 5 | 2249 C 6 | 2267 C 4 | 2288 A 4 | 3211 C 7 | 3246 B 7 | 3262 B 7 | 3277 D 5 | 3296 B 4 | 6241 B 6 | 6263 B 7 | 7245 B 7 | 9209 C 2 | 9223 C 7 | 9240 C 7 | 9281 D 4 |
| 14 C 1 | 1231 D 1 | 2234 A 5 | 2250 C 6 | 2271 D 4 | 2289 B 4 | 3212 B 7 | 3247 B 7 | 3263 B 7 | 3281 D 4 | 3297 B 4 | 6242 B 6 | 6265 B 7 | 7246 B 7 | 9210 C 3 | 9224 B 6 | 9241 C 7 | 9282 D 5 |
| 1201 D 3 | 1237 A 7 | 2235 A 6 | 2251 A 7 | 2272 C 5 | 2290 A 4 | 3214 B 7 | 3248 C 7 | 3264 B 7 | 3282 D 5 | 3298 A 4 | 6243 C 7 | 6271 D 5 | 7247 C 6 | 9212 C 3 | 9225 B 5 | 9244 C 7 | 9719 D 7 |
| 1202 C 3 | 1290 B 3 | 2239 D 6 | 2252 B 7 | 2273 C 4 | 2291 C 5 | 3215 B 7 | 3249 C 7 | 3265 B 6 | 3283 D 4 | 3299 C 6 | 6244 C 7 | 6272 D 5 | 7248 B 7 | 9213 A 4 | 9226 C 7 | 9246 B 5 | 9720 D 7 |
| 1205 D 3 | 2220 B 5 | 2240 B 5 | 2253 C 7 | 2274 D 5 | 2292 C 5 | 3216 B 7 | 3250 C 7 | 3266 B 6 | 3284 D 5 | 5202 D 2 | 6245 C 7 | 6273 D 7 | 7261 B 7 | 9214 A 4 | 9229 B 4 | 9247 B 5 | ---- |
| 1206 D 1 | 2221 B 5 | 2241 D 7 | 2254 A 7 | 2281 C 4 | 2293 D 5 | 3217 B 7 | 3251 B 6 | 3267 C 6 | 3287 D 4 | 5280 B 2 | 6247 C 7 | 7231 A 6 | 7291 C 4 | 9215 A 4 | 9230 B 4 | 9248 B 5 | |
| 1208 C 2 | 2222 B 5 | 2242 C 7 | 2261 B 6 | 2282 C 5 | 2295 D 5 | 3231 A 6 | 3252 B 6 | 3268 C 6 | 3288 D 5 | 6220 B 4 | 6248 C 6 | 7232 A 6 | 9201 D 2 | 9216 A 4 | 9231 A 6 | 9249 D 7 | |
| 1210 C 1 | 2224 C 5 | 2243 B 6 | 2262 A 7 | 2283 C 4 | 2296 D 4 | 3241 C 6 | 3255 C 7 | 3269 C 6 | 3289 D 4 | 6231 A 5 | 6251 B 6 | 7233 A 7 | 9202 D 2 | 9217 A 4 | 9233 B 7 | 9250 C 5 | |
| 1211 C 1 | 2225 C 5 | 2245 B 6 | 2263 B 7 | 2284 C 4 | 2297 C 4 | 3242 B 6 | 3256 C 6 | 3270 C 6 | 3290 D 5 | 6232 A 5 | 6252 A 6 | 7241 C 7 | 9203 C 2 | 9218 B 6 | 9234 C 7 | 9251 C 5 | |
| 1212 C 1 | 2230 B 5 | 2246 C 6 | 2264 C 6 | 2285 C 5 | 2298 C 5 | 3243 B 6 | 3258 B 7 | 3271 C 4 | 3293 C 5 | 6233 A 5 | 6253 A 7 | 7242 B 6 | 9205 D 3 | 9219 D 6 | 9235 A 7 | 9252 C 5 | |
| 1222 A 7 | 2231 A 5 | 2247 C 7 | 2265 B 4 | 2286 C 5 | 3201 D 2 | 3244 B 6 | 3260 B 7 | 3272 C 4 | 3294 C 5 | 6234 A 5 | 6261 B 6 | 7243 C 7 | 9207 C 2 | 9220 D 7 | 9238 A 6 | 9269 D 6 | |

## COMPONENT LAYOUT COMPONENTSIDE


1
2
3
4
5
6
7
A
B
C
D
mc150/pw2vapanel-p1-960701-1 mpch
3139 113 33371
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE REPLACE WITH SAME TYPE: TR5, SLOW BLOW, 125V MIN. FUSE.
ATTENTION: POUR PROTECTION CONTRE INCENDIE, RECHANGEZ LE FUSIBLE SEULEMENT PAR LE MEME TYPE: FUSIBLE TR5, LENT, 125V MIN
REFER REPLACEMENT TO QUALIFIED SERVICE PERSONNEL
T1.0A
T1.0A
UL T2.8A
IEC T1.6A
UL T6.3A
IEC T5.0A
IEC T2.0A
flow direction
PHILIPS
mc150/pw2va-P1-960701-1
3139 113 33371
PHILIPS
mc150/pw2va-P1-960701-1
3139 113 33371
mc150/pw2vapanel-p1-960701-1
3139 113 3337.1
5280
5202
3201
1201
1202
1206
1208
1210
1211
1212
1231
1290
1237
1223
1224
7291
6220
9208
9207
9203
9225
9250
9251

## POWER BOARD PARTLIST

### MISCELLANEOUS

| | | |
|---|---|---|
| 21 | 4822 492 63051 | Spring |
| 22 | 4822 492 71734 | Spring |
| 24 | 4822 492 11084 | Spring |
| 1201 | 4822 265 31015 | AC Socket |
| 1202 | 4822 272 10269 | Voltage Selector -/21/21M |
| 1205 | 4822 071 52002 | Fuse 2A -/21/21M |
| 1206 | 4822 071 55002 | Fuse 5A |
| 1211 | 4822 071 51002 | Fuse 1A |
| 1212 | 4822 071 51002 | Fuse 1A |

### CAPACITORS

| | | |
|---|---|---|
| 2220 | 5322 121 42386 | 100nF 5% 63V |
| 2221 | 5322 121 42386 | 100nF 5% 63V |
| 2222 | 5322 121 42386 | 100nF 5% 63V |
| 2224 | 4822 124 11516 | 6800uF 20% 35V |
| 2239 | 4822 122 33519 | 470pF 10% 50V |
| 2240 | 5322 121 52386 | 100nF 5% 63V |
| 2241 | 4822 122 33197 | 1nF 10% 50V |
| 2242 | 4822 124 22263 | 220µF 20% 25V |
| 2243 | 4822 124 42057 | 3300µF 20% 25V |
| 2245 | 4822 124 40433 | 47µF 20% 25V |
| 2246 | 4822 122 33197 | 1nF 10% 50V |
| 2247 | 4822 122 33197 | 1nF 10% 50V |
| 2248 | 4822 124 22263 | 220µF 20% 25V |
| 2249 | 4822 124 40433 | 47µF 20% 25V |
| 2250 | 4822 124 41584 | 100µF 20% 10V |
| 2251 | 4822 126 12785 | 47nF TUB 50V |
| 2252 | 4822 122 33197 | 1nF 10% 50V |
| 2253 | 4822 122 33197 | 1nF 10% 50V |
| 2254 | 4822 126 12882 | 100nF +80-20% 50V |
| 2261 | 4822 126 12882 | 100nF +80-20% 50V |
| 2262 | 4822 124 40255 | 100µF 20% 63V |
| 2263 | 4822 124 41596 | 22µF 20% 50V |
| 2264 | 4822 124 81136 | 100µF 10% 25V (FW373C) |
| 2265 | 4822 121 51387 | 10nF 20% 16V |
| 2266 | 4822 121 51387 | 10nF 20% 16V |
| 2267 | 4822 122 33197 | 1nF 10% 50V |
| 2271 | 4822 121 51387 | 10nF 20% 16V |
| 2272 | 4822 121 51387 | 10nF 20% 16V |
| 2273 | 4822 124 40433 | 47µF 20% 25V |
| 2274 | 4822 124 40433 | 47µF 20% 25V |

### CAPACITORS

| | | |
|---|---|---|
| 2281 | 4822 122 10577 | 3.3nF 10% 16V |
| 2282 | 4822 122 10577 | 3.3nF 10% 16V |
| 2283 | 4822 124 22263 | 220µF 20% 25V |
| 2284 | 4822 124 22263 | 220µF 20% 25V |
| 2285 | 5322 121 52386 | 100nF 5% 63V |
| 2285 | 5322 121 52386 | 100nF 5% 63V |
| 2287 | 4822 124 80148 | 2200µF 20% 16V |
| 2288 | 4822 124 80148 | 2200µF 20% 16V |
| 2289 | 4822 126 12785 | 47nF +80-20% 50V |
| 2290 | 4822 126 12785 | 47nF +80-20% 50V |
| 2291 | 4822 124 40242 | 1µF 20% 63V |
| 2293 | 4822 124 41334 | 470µF 20% 63V |
| 2295 | 4822 122 33519 | 470pF 10% 50V |
| 2297 | 4822 122 33848 | 47pF 5% 50V (FW373C) |
| 2298 | 4822 122 33848 | 47pF 5% 50V (FW373C) |

### RESISTORS

| | | |
|---|---|---|
| 3201 | 4822 053 21106 | 10M 5% 0.5W |
| 3204 | 4822 052 10108 | 1Ω 5% 0.33W |
| 3211 | 4822 050 11002 | 1k 1% 0.5W |
| 3212 | 4822 050 11002 | 1k 1% 0.5W |
| 3214 | 4822 116 52256 | 2k2 5% 0.5W |
| 3215 | 4822 116 52256 | 2k2 5% 0.5W |
| 3216 | 4822 116 52256 | 2k2 5% 0.5W |
| 3217 | 4822 116 52256 | 2k2 5% 0.5W |
| 3241 | 4822 116 83961 | 6k8 5% 0.5W |
| 3242 | 4822 050 11002 | 1k 1% 0.4W |
| 3243 | 4822 050 11002 | 1k 1% 0.4W |
| 3244 | 4822 050 11002 | 1k 1% 0.4W |
| 3245 | 4822 116 52283 | 4k7 5% 0.5W |
| 3246 | 4822 116 52283 | 4k7 5% 0.5W |
| 3247 | 4822 116 52283 | 4k7 5% 0.5W |
| 3248 | 4822 116 52228 | 680R 5% 0.5W |
| 3249 | 4822 116 52264 | 27k 5% 0.5W |
| 3250 | 4822 116 52257 | 22k 5% 0.5W |
| 3251 | 4822 116 52283 | 4k7 5% 0.5W |
| 3252 | 4822 116 52283 | 4k7 5% 0.5W |
| 3255 | 4822 116 52263 | 2k7 5% 0.5W |
| 3256 | 4822 116 52283 | 4k7 5% 0.5W |
| 3258 | 4822 116 52207 | 1k2 5% 0.5W |
| 3260 | 4822 116 83882 | 39k 5% 0.5W |
| 3261 | 4822 116 52276 | 3k9 5% 0.5W |

## POWER BOARD PARTLIST

### RESISTORS

| | | |
|---|---|---|
| 3262 | 4822 052 10479 | 47Ω 5% 0.33W |
| 3263 | 4822 116 83864 | 10k 5% 0.5W |
| 3264 | 4822 116 52257 | 22k 5% 0.5W |
| 3265 | 4822 052 10479 | 47Ω 5% 0.33W |
| 3266 | 4822 052 10479 | 47Ω 5% 0.33W |
| 3267 | 4822 052 10278 | 2R7 5% 0.33W |
| 3268 | 4822 116 52243 | 1k5 5% 0.5W |
| 3269 | 4822 116 52243 | 1k5 5% 0.5W |
| 3270 | 4822 116 52243 | 1k5 5% 0.5W |
| 3271 | 4822 116 52284 | 47k 5% 0.5W |
| 3272 | 4822 116 52284 | 47k 5% 0.5W |
| 3276 | 4822 116 52284 | 47k 5% 0.5W |
| 3277 | 4822 116 52283 | 4k7 5% 0.5W |
| 3281 | 4822 116 52263 | 2k7 5% 0.5W |
| 3282 | 4822 116 52263 | 2k7 5% 0.5W |
| 3283 | 4822 116 52249 | 1K8 5% 0.5W |
| 3284 | 4822 116 52249 | 1K8 5% 0.5W |
| 3287 | 4822 116 52263 | 2K7 5% 0.5W |
| 3288 | 4822 116 52263 | 2K7 5% 0.5W |
| 3289 | 4822 116 52222 | 390Ω 5% 0.5W |
| 3290 | 4822 116 52222 | 390Ω 5% 0.5W |
| 3293 | 4822 052 10228 | 2Ω2 5% 0.33W |
| 3294 | 4822 052 10228 | 2Ω2 5% 0.33W |
| 3295 | 4822 116 52256 | 2K2 5% 0.5W |
| 3296 | 4822 116 52256 | 2K2 5% 0.5W |
| 3297 | 4822 117 12148 | 1Ω5 5% 330mW |
| 3298 | 4822 117 12148 | 1Ω5 5% 330mW |
| 3299 | 4822 052 10479 | 47R 5% 0.33W |

### COILS

| | | |
|---|---|---|
| 5202 | 4822 157 71285 | Coil 400µH 30% (Not for -/37) |

### DIODES

| | | |
|---|---|---|
| 6220 | 4822 130 82078 | Diode Bridge D5SBA20 |
| 6241 | 5322 130 80686 | 1N5392 |
| 6242 | 5322 130 80686 | 1N5392 |
| 6243 | 4822 130 30621 | 1N4148 |
| 6244 | 4822 130 34173 | BZX79-C5V6 |
| 6245 | 4822 130 34173 | BZX79-C5V6 |
| 6247 | 4822 130 30621 | 1N4148 |
| 6248 | 5322 130 30684 | 1N4002 |
| 6251 | 4822 130 30621 | 1N4148 |
| 6252 | 4822 130 30621 | 1N4148 |

### DIODES

| | | |
|---|---|---|
| 6253 | 4822 130 34382 | BZX79-C8V2 |
| 6261 | 5322 130 30684 | 1N4002 |
| 6262 | 4822 130 31024 | BZX79-C18 |
| 6263 | 4822 130 34281 | BZX79-C15 |
| 6265 | 4822 130 34174 | BZX79-C4V7 |
| 6271 | 4822 130 30621 | 1N4148 |
| 6272 | 4822 130 34174 | BZX79-C4V7 |

### TRANSISTORS

| | | |
|---|---|---|
| 9241 | 4822 130 40982 | BD437 |
| 7242 | 4822 130 40995 | BD438 |
| 7243 | 4822 130 40937 | BC548B |
| 7244 | 4822 130 44197 | BC558B |
| 8245 | 4822 130 44197 | BC558B |
| 7246 | 4822 130 40937 | BC548B |
| 8247 | 4822 209 80817 | L7805CV |
| 7248 | 4822 130 40937 | BC548B |
| 7261 | 4822 130 40917 | BD238 |
| 7291 | 4822 209 90411 | AN7164 |

# AF3 BOARD

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## BRIEF INTRODUCTION OF AF3 BOARD

The AF3 Board consists of the following:

a. SOFAC IC which includes functions such as source selection, loudness control, dynamic bass control, treble control, front/ rear volume control and muting function. Sound features such as DBB, DSC, and IS are controllable via I²C data from the microprocessor.
The SOFAC IC caters for 4 input sources namely Tuner, Tape, CD and AUX.

b. Karaoke Mic Mixing
NK: Non-Karaoke
SK: Simple Karaoke which caters for mic. mixing with additional mic. amplifier board.
FK: Full Karaoke with vocal fader and echo effect with additional Karaoke Board.

c. Dolby Pro-Logic interface
It caters for DPL and also DPL with one of the Karaoke functions.

d. Line out provision

e. Sub-woofer output with cinch socket for connection to active sub-woofer speaker.

f. Incredible Surround effect using transistor circuit to create phase shifting and spatial effect.

g. Headphone amplifier using Op-Amp. NJM4456M

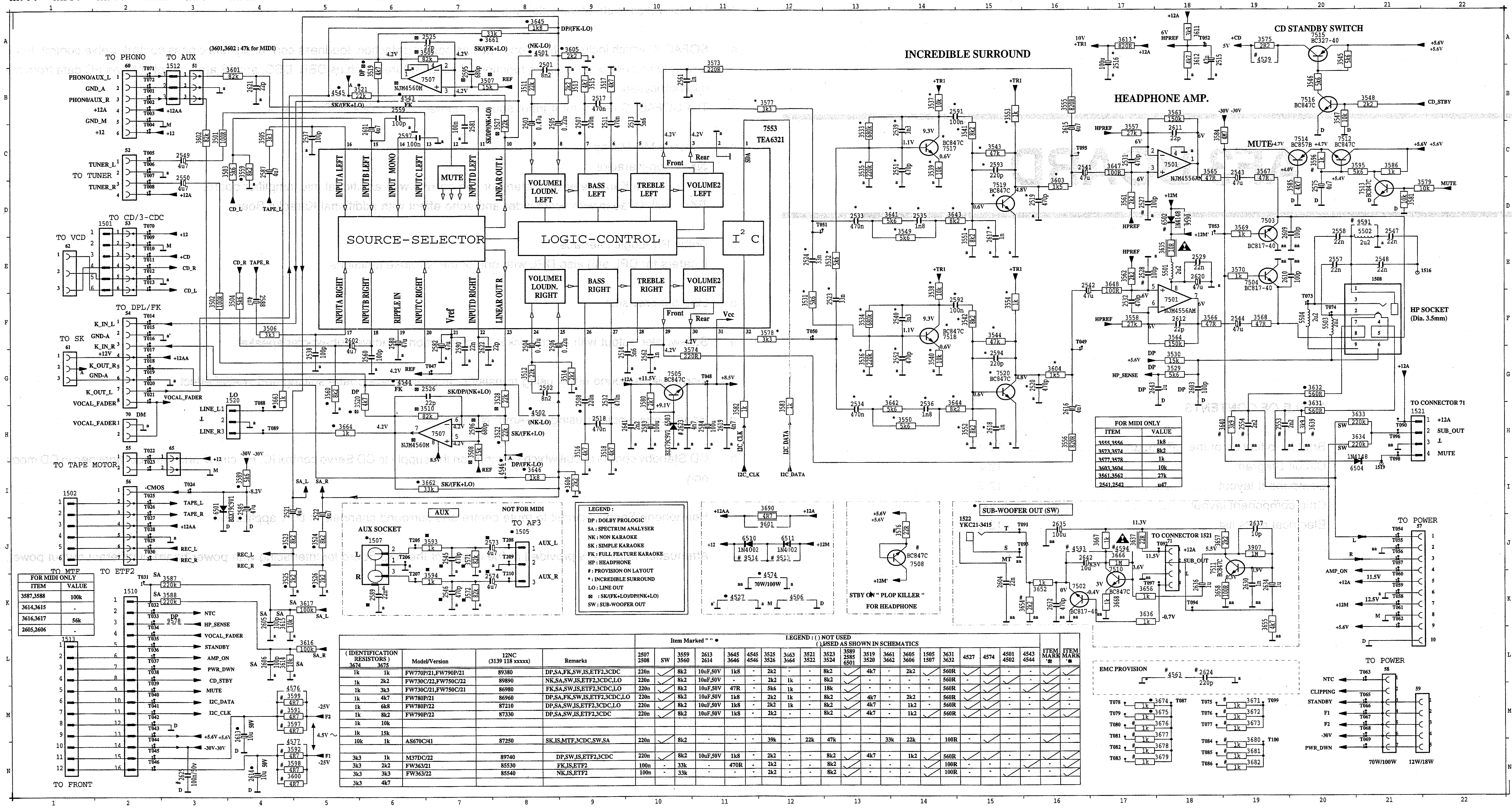
h. CD Standby control circuit which switches on the supply to CD Servo control IC, HF circuit and the laser light pen in CD mode only.

i. Headphone Sensing circuit to mute centre and surround channels in DPL application.

j. Attenuation network is provided at the output of the AF3 Board for interfacing with power board of different output power.

# AF3 CIRCUIT

| | |
|---|---|
| 1501 | D 2 |
| 1502 | I 1 |
| 1505 | J 8 |
| 1507 | J 6 |
| 1508 | E21 |
| 1510 | K 2 |
| 1512 | A 3 |
| 1513 | L 1 |
| 1516 | E21 |
| 1519 | I21 |
| 1520 | G 4 |
| 1521 | H21 |
| 1522 | J15 |
| 2501 | A 8 |
| 2502 | G 8 |
| 2503 | B 8 |
| 2504 | F 8 |
| 2505 | B 8 |
| 2506 | F 8 |
| 2507 | B 9 |
| 2508 | G 9 |
| 2511 | B 9 |
| 2512 | G 9 |
| 2513 | B10 |
| 2514 | G 9 |
| 2515 | A18 |
| 2516 | A17 |
| 2517 | B 9 |
| 2518 | H 9 |
| 2519 | D16 |
| 2520 | G16 |
| 2521 | I 4 |
| 2522 | I 5 |
| 2523 | F13 |
| 2524 | E12 |
| 2525 | A 7 |
| 2526 | G 7 |
| 2527 | D17 |
| 2528 | E17 |
| 2529 | E18 |
| 2531 | C17 |
| 2532 | F17 |
| 2533 | D13 |
| 2534 | H13 |
| 2535 | D14 |
| 2536 | H14 |
| 2537 | C 5 |
| 2538 | G 5 |
| 2539 | C14 |
| 2540 | F14 |
| 2541 | C16 |
| 2542 | E16 |
| 2543 | C19 |
| 2544 | F19 |
| 2545 | J 7 |
| 2546 | K 7 |
| 2547 | D21 |
| 2548 | E21 |
| 2549 | C 3 |
| 2550 | C 3 |
| 2551 | C14 |
| 2552 | G14 |
| 2553 | H19 |
| 2554 | H19 |
| 2557 | E20 |
| 2558 | D20 |
| 2559 | B 6 |
| 2560 | G 6 |
| 2561 | B10 |
| 2562 | G10 |
| 2573 | J 7 |
| 2574 | K 7 |
| 2575 | D20 |
| 2580 | F 6 |
| 2581 | C 7 |
| 2582 | F 7 |
| 2583 | H10 |
| 2584 | H11 |
| 2585 | I 4 |
| 2587 | C 4 |
| 2588 | F 4 |
| 2589 | K 6 |
| 2590 | F 7 |
| 2591 | B15 |
| 2592 | F15 |
| 2593 | C15 |
| 2594 | G15 |
| 2595 | B 7 |
| 2596 | H 7 |
| 2597 | C 6 |
| 2601 | C 6 |
| 2602 | F 5 |
| 2603 | G18 |
| 2604 | K15 |
| 2605 | K 4 |
| 2606 | L 4 |
| 2609 | D19 |
| 2610 | E19 |
| 2611 | C18 |
| 2612 | F18 |
| 2613 | M 4 |
| 2614 | N 4 |
| 2615 | C16 |
| 2616 | H16 |
| 2617 | E15 |
| 2618 | H15 |
| 2619 | H11 |
| 2620 | E18 |
| 2621 | B 4 |
| 2622 | F 7 |
| 2623 | H10 |
| 2624 | L18 |
| 2625 | N 3 |
| 2630 | K19 |
| 2632 | K16 |
| 2634 | K19 |
| 2635 | J16 |
| 2636 | K18 |
| 2637 | J19 |
| 2641 | H10 |
| 2642 | J16 |
| 2643 | G17 |
| 3501 | C 3 |
| 3502 | F 3 |
| 3503 | C 4 |
| 3504 | F 4 |
| 3505 | C 4 |
| 3506 | F 4 |
| 3507 | B 7 |
| 3508 | H 7 |
| 3509 | A 7 |
| 3510 | H 7 |
| 3511 | B 8 |
| 3512 | G 8 |
| 3513 | B 9 |
| 3514 | G 9 |
| 3515 | B 9 |
| 3516 | H 9 |
| 3517 | B 9 |
| 3518 | H 9 |
| 3519 | B 6 |
| 3520 | G 6 |
| 3521 | B 6 |
| 3522 | H 8 |
| 3523 | J 4 |
| 3524 | J 5 |
| 3525 | K 4 |
| 3526 | K 5 |
| 3527 | C 8 |
| 3528 | G 8 |
| 3529 | G18 |
| 3530 | G18 |
| 3531 | F12 |
| 3532 | E13 |
| 3533 | C13 |
| 3534 | F13 |
| 3535 | C13 |
| 3536 | G13 |
| 3537 | B14 |
| 3538 | F14 |
| 3539 | C14 |
| 3540 | G14 |
| 3541 | C15 |
| 3542 | F15 |
| 3543 | C15 |
| 3544 | F15 |
| 3545 | A20 |
| 3546 | B20 |
| 3547 | B20 |
| 3548 | B21 |
| 3549 | D14 |
| 3550 | H14 |
| 3551 | E15 |
| 3552 | H15 |
| 3553 | B15 |
| 3554 | F15 |
| 3555 | B16 |
| 3556 | H16 |
| 3557 | C17 |
| 3558 | F17 |
| 3559 | C 4 |
| 3560 | G 5 |
| 3561 | D17 |
| 3562 | E17 |
| 3563 | B18 |
| 3564 | F18 |
| 3565 | C18 |
| 3566 | F18 |
| 3567 | C19 |
| 3568 | F19 |
| 3569 | D19 |
| 3570 | E19 |
| 3571 | J 7 |
| 3572 | K 7 |
| 3573 | A11 |
| 3574 | G11 |
| 3575 | A19 |
| 3576 | J14 |
| 3577 | B12 |
| 3578 | F12 |
| 3579 | D22 |
| 3580 | G10 |
| 3581 | D21 |
| 3582 | H11 |
| 3583 | H12 |
| 3584 | C18 |
| 3585 | D20 |
| 3586 | C21 |
| 3587 | K 3 |
| 3588 | K 3 |
| 3589 | I 4 |
| 3591 | M 5 |
| 3592 | N 5 |
| 3593 | J 7 |
| 3594 | K 7 |
| 3595 | C21 |
| 3596 | C20 |
| 3597 | M 5 |
| 3598 | N 5 |
| 3599 | M 5 |
| 3600 | N 5 |
| 3601 | B 4 |
| 3602 | C 3 |
| 3603 | D16 |
| 3604 | G16 |
| 3605 | A 9 |
| 3606 | I 9 |
| 3611 | A18 |
| 3612 | A18 |
| 3613 | A17 |
| 3614 | L 4 |
| 3615 | K 4 |
| 3616 | L 5 |
| 3617 | K 5 |
| 3631 | H20 |
| 3632 | G20 |
| 3633 | H21 |
| 3634 | H21 |
| 3635 | E18 |
| 3636 | K17 |
| 3637 | J17 |
| 3639 | H20 |
| 3640 | H19 |
| 3641 | D14 |
| 3642 | H14 |
| 3643 | D14 |
| 3644 | H14 |
| 3645 | A 8 |
| 3646 | I 8 |
| 3647 | C17 |
| 3648 | E17 |
| 3652 | K16 |
| 3654 | K16 |
| 3655 | K19 |
| 3656 | K17 |
| 3657 | J18 |
| 3658 | K18 |
| 3661 | A 8 |
| 3662 | I 7 |
| 3663 | G 4 |
| 3664 | H 5 |
| 3666 | J17 |
| 3667 | J17 |
| 3668 | K17 |
| 3671 | M19 |
| 3672 | M19 |
| 3673 | M19 |
| 3674 | M18 |
| 3675 | M18 |
| 3676 | M18 |
| 3677 | M18 |
| 3678 | N18 |
| 3679 | N18 |
| 3680 | N19 |
| 3681 | N19 |
| 3682 | N19 |
| 3690 | I12 |
| 3907 | J19 |
| 4501 | A 8 |
| 4502 | H 8 |
| 4506 | K12 |
| 4527 | K11 |
| 4529 | A19 |
| 4543 | B 6 |
| 4544 | G 6 |
| 4545 | B 5 |
| 4546 | I 8 |
| 4563 | L18 |
| 4574 | K12 |
| 4576 | M 4 |
| 4577 | N 4 |
| 4593 | J16 |
| 4594 | J17 |
| 51 | A 3 |
| 52 | C 2 |
| 53 | D 2 |
| 54 | F 2 |
| 55 | H 2 |
| 5501 | E18 |
| 5502 | D21 |
| 5503 | F20 |
| 5504 | F20 |
| 56 | I 2 |
| 57 | J21 |
| 58 | L21 |
| 59 | M21 |
| 60 | A 2 |
| 61 | F 1 |
| 62 | E 1 |
| 65 | H 3 |
| 6501 | I 3 |
| 6502 | D18 |
| 6503 | H10 |
| 6504 | I21 |
| 6510 | J11 |
| 6511 | J12 |
| 70 | H 2 |
| 71 | J18 |
| 7501 | C18 |
| 7501 | F18 |
| 7502 | K16 |
| 7503 | D19 |
| 7504 | E19 |
| 7505 | G10 |
| 7507 | B 6 |
| 7507 | H 7 |
| 7508 | J14 |
| 7510 | J17 |
| 7511 | K18 |
| 7512 | C20 |
| 7513 | D21 |
| 7514 | C20 |
| 7515 | A20 |
| 7516 | B20 |
| 7517 | C15 |
| 7518 | F15 |
| 7519 | D15 |
| 7520 | G15 |
| 7553 | C12 |
| 9513 | J12 |
| 9514 | J11 |
| 9578 | K 3 |
| 9590 | D18 |
| 9591 | D21 |
| 9601 | J12 |


(3601,3602 : 47k for MIDI)
TO PHONO
TO AUX
TO TUNER
TO CD/3-CDC
TO VCD
TO DPL/FK
TO SK
TO TAPE MOTOR
TO MTF
TO ETF2
TO FRONT
SOURCE-SELECTOR
LOGIC-CONTROL
I²C
MUTE
VOLUME1 LOUDN. LEFT
BASS LEFT
TREBLE LEFT
VOLUME2 LEFT
VOLUME1 LOUDN. RIGHT
BASS RIGHT
TREBLE RIGHT
VOLUME2 RIGHT
7553 TEA6321
NJM4560M
INCREDIBLE SURROUND
HEADPHONE AMP.
CD STANDBY SWITCH
MUTE
HP SOCKET (Dia. 3.5mm)
TO CONNECTOR 71
AUX SOCKET
NOT FOR MIDI
TO AF3
STBY ON " PLOP KILLER " FOR HEADPHONE
SUB-WOOFER OUT (SW)
TO CONNECTOR 1521
TO POWER
EMC PROVISION
70W/100W
12W/18W

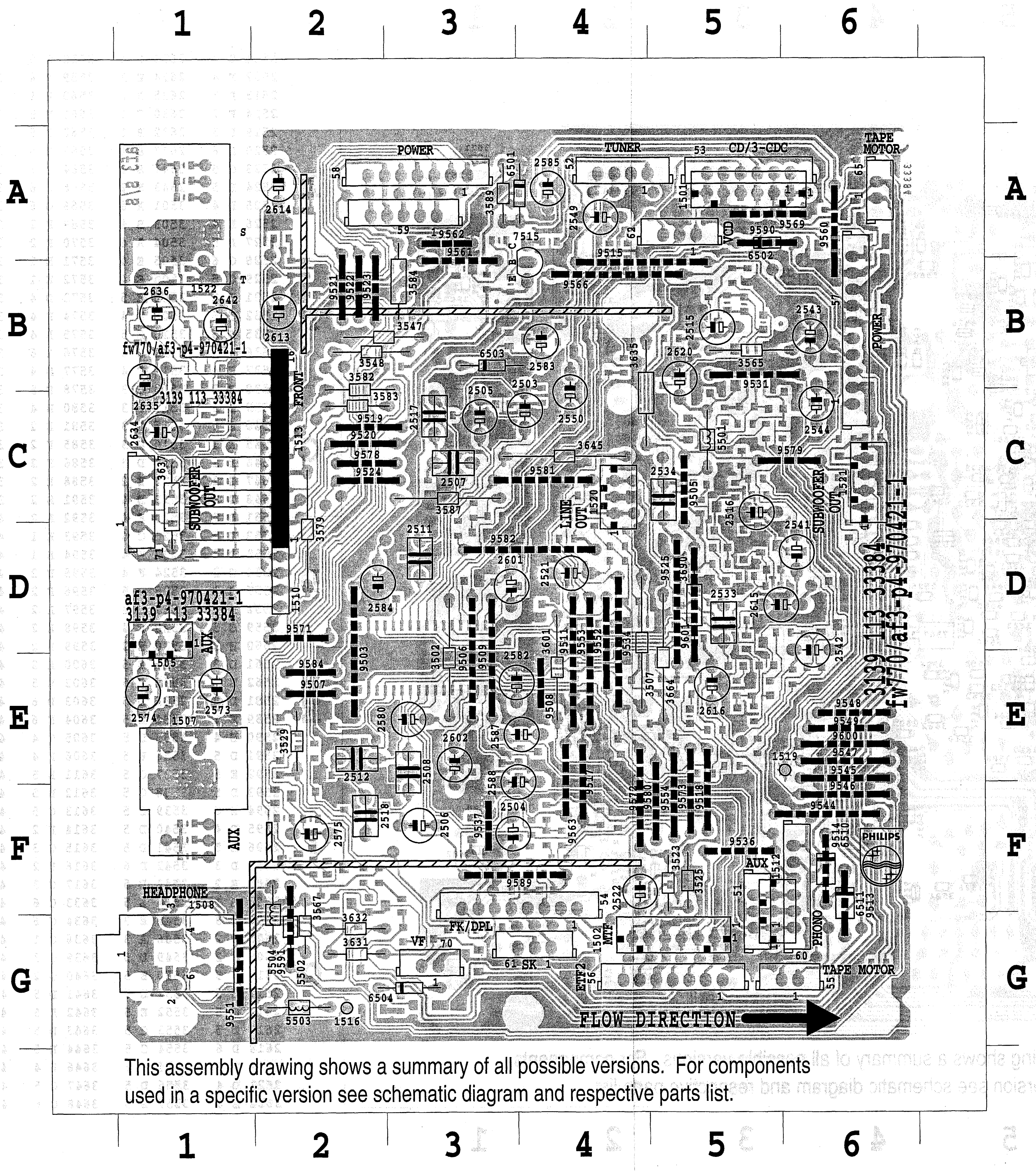
LEGEND :
DP : DOLBY PROLOGIC
SA : SPECTRUM ANALYSER
NK : NON KARAOKE
SK : SIMPLE KARAOKE
FK : FULL FEATURE KARAOKE
HP : HEADPHONE
# : PROVISION ON LAYOUT
* : INCREDIBLE SURROUND
LO : LINE OUT
⊠ : SK/(FK+LO)/DP/(NK+LO)
SW : SUB-WOOFER OUT

| FOR MIDI ONLY | |
|---|---|
| ITEM | VALUE |
| 3587,3588 | 100k |
| 3614,3615 | - |
| 3616,3617 | 56k |
| 2605,2606 | - |

| FOR MIDI ONLY | |
|---|---|
| ITEM | VALUE |
| 3555,3556 | 1k8 |
| 3573,3574 | 8k2 |
| 3577,3578 | 1k |
| 3603,3604 | 10k |
| 3561,3562 | 27k |
| 2541,2542 | u47 |

| ( IDENTIFICATION RESISTORS ) | | | | | Item Marked " " ● | | | | | | | LEGEND : ( ) NOT USED ( ✓)USED AS SHOWN IN SCHEMATICS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3674 | 3675 | Model/Version | 12NC (3139 118 xxxxx) | Remarks | 2507 2508 | SW | 3559 3560 | 2613 2614 | 3645 3646 | 4545 4546 | 3525 3526 | 3663 3664 | 3521 3522 | 3523 3524 | 3589 2585 6501 | 3519 3520 | 3661 3662 | 3605 3606 | 1505 1507 | 3631 3632 | 4527 | 4574 | 4501 4502 | 4543 4544 | ITEM MARK '⊠' | ITEM MARK '■' |
| 1k | 1k | FW770P/21,FW790P/21 | 89380 | DP,SA,FK,SW,IS,ETF2,3CDC | 220n | ✓ | 8k2 | 10uF,50V | 1k8 | - | 2k2 | - | - | 8k2 | ✓ | 4k7 | - | 2k2 | ✓ | 560R | ✓ | ✓ | - | - | ✓ | ✓ |
| 1k | 2k2 | FW730C/22,FW750C/22 | 89890 | NK,SA,SW,IS,ETF2,3CDC,LO | 220n | ✓ | 8k2 | 10uF,50V | - | - | 2k2 | 1k | - | 8k2 | ✓ | - | - | - | - | 560R | - | ✓ | ✓ | - | ✓ | - |
| 1k | 3k3 | FW730C/21,FW750C/21 | 86980 | FK,SA,SW,IS,ETF2,3CDC,LO | 220n | ✓ | 8k2 | 10uF,50V | 47R | - | 5k6 | 1k | - | 18k | ✓ | - | - | - | - | 560R | ✓ | ✓ | - | ✓ | ✓ | - |
| 1k | 4k7 | FW780P/21 | 86960 | DP,SA,FK,SW,IS,ETF2,3CDC,LO | 220n | ✓ | 8k2 | 10uF,50V | 1k8 | - | 2k2 | 1k | - | 8k2 | ✓ | 4k7 | - | 2k2 | - | 560R | ✓ | ✓ | - | - | ✓ | - |
| 1k | 6k8 | FW780P/22 | 87210 | DP,SA,SW,IS,ETF2,3CDC,LO | 220n | ✓ | 8k2 | 10uF,50V | 1k8 | - | 2k2 | 1k | - | 8k2 | ✓ | 4k7 | - | 1k2 | - | 560R | ✓ | ✓ | - | - | ✓ | - |
| 1k | 8k2 | FW790P/22 | 87330 | DP,SA,SW,IS,ETF2,3CDC | 220n | ✓ | 8k2 | 10uF,50V | 1k8 | - | 2k2 | - | - | 8k2 | ✓ | 4k7 | - | 1k2 | ✓ | 560R | ✓ | ✓ | - | - | ✓ | ✓ |
| 1k | 10k | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1k | 15k | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10k | 1k | AS670C/41 | 87250 | SK,IS,MTF,3CDC,SW,SA | 220n | ✓ | 8k2 | - | - | - | 39k | - | 22k | 47k | - | - | 33k | 22k | - | 100R | - | ✓ | - | - | ✓ | - |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3k3 | 1k | M37DC/22 | 89740 | DP,SW,IS,ETF2,3CDC | 220n | ✓ | 8k2 | 10uF,50V | 1k8 | - | 2k2 | - | - | 8k2 | ✓ | 4k7 | - | 1k2 | ✓ | 560R | ✓ | ✓ | - | - | ✓ | ✓ |
| 3k3 | 2k2 | FW363/21 | 85530 | FK,IS,ETF2 | 100n | - | 33k | - | 470R | - | 2k2 | - | - | 8k2 | ✓ | - | - | - | ✓ | 100R | - | - | - | ✓ | - | ✓ |
| 3k3 | 3k3 | FW363/22 | 85540 | NK,IS,ETF2 | 100n | - | 33k | - | - | - | 2k2 | - | - | 8k2 | ✓ | - | - | - | ✓ | 100R | - | - | ✓ | - | - | ✓ |
| 3k3 | 4k7 | | | | | | | | | | | | | | | | | | | | | | | | | |

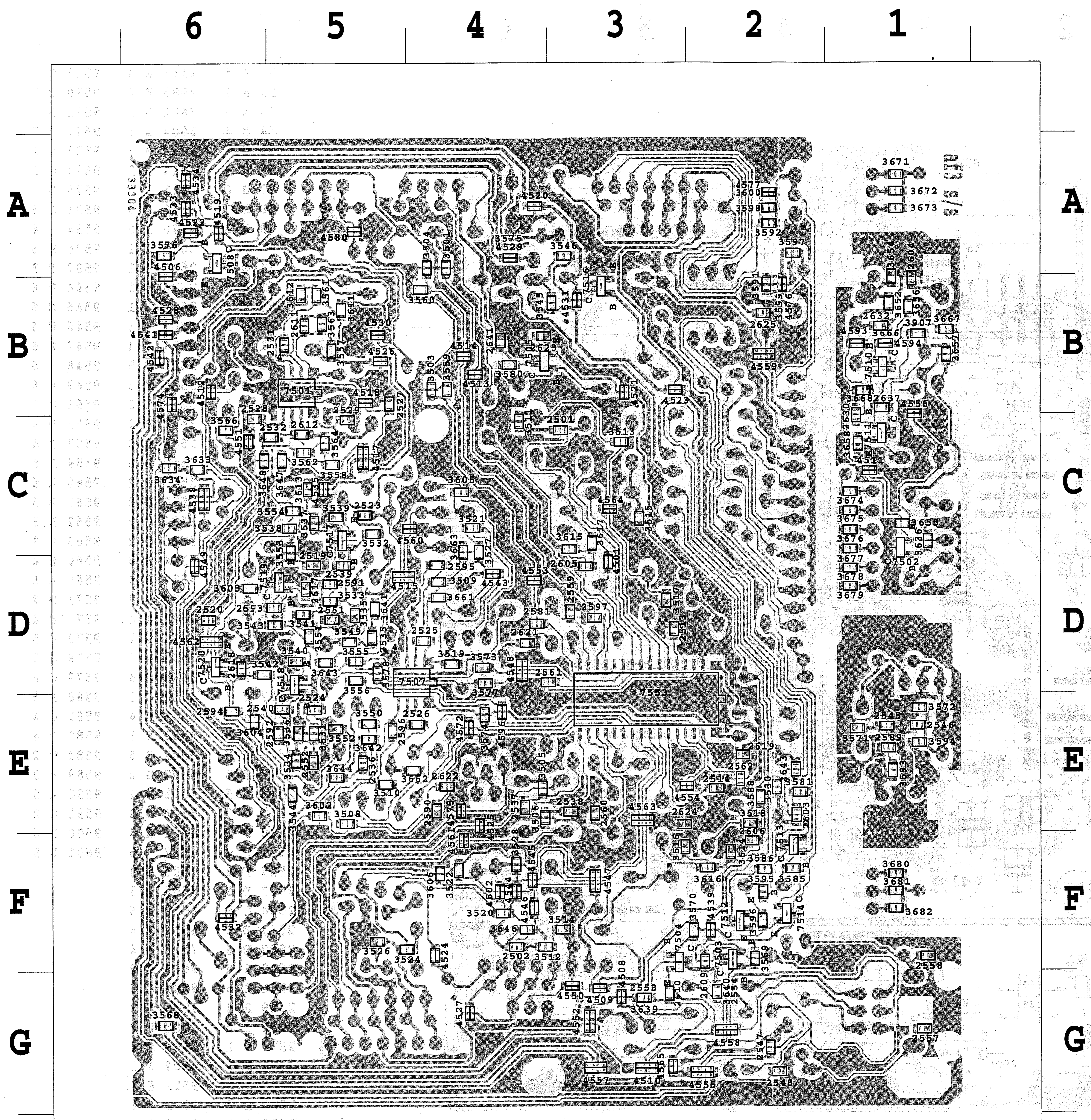
## COMPONENT LAYOUT


1
2
3
4
5
6
A
B
C
D
E
F
G
POWER
TUNER
CD/3-CDC
TAPE MOTOR
FRONT
SUBWOOFER OUT
LINE OUT
AUX
HEADPHONE
VF
FK/DPL
SK
MTF
ETF2
PHONO
PHILIPS
fw770/af3-p4-970421-1
3139 113 33384
af3-p4-970421-1
FLOW DIRECTION

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

| | | |
|---|---|---|
| 51 | F | 5 |
| 52 | A | 4 |
| 53 | A | 5 |
| 54 | F | 4 |
| 55 | G | 6 |
| 56 | G | 5 |
| 57 | B | 6 |
| 58 | A | 3 |
| 59 | A | 3 |
| 60 | F | 6 |
| 61 | G | 4 |
| 62 | A | 5 |
| 65 | A | 6 |
| 70 | G | 3 |
| 71 | C | 1 |
| 1501 | A | 5 |
| 1502 | G | 5 |
| 1505 | D | 1 |
| 1507 | E | 1 |
| 1508 | G | 1 |
| 1510 | C | 2 |
| 1512 | F | 5 |
| 1513 | C | 2 |
| 1516 | G | 2 |
| 1518 | E | 6 |
| 1520 | C | 4 |
| 1521 | C | 6 |
| 1522 | A | 1 |
| 2503 | C | 4 |
| 2504 | F | 3 |
| 2505 | C | 3 |
| 2506 | F | 3 |
| 2507 | C | 3 |
| 2508 | E | 3 |
| 2511 | D | 3 |
| 2512 | E | 2 |
| 2515 | B | 5 |
| 2516 | C | 5 |
| 2517 | C | 3 |
| 2518 | F | 2 |
| 2521 | D | 4 |
| 2522 | F | 4 |
| 2533 | D | 5 |
| 2534 | C | 5 |
| 2541 | D | 6 |
| 2542 | D | 6 |
| 2543 | B | 6 |
| 2544 | C | 6 |
| 2549 | A | 4 |
| 2550 | C | 4 |
| 2573 | E | 1 |
| 2574 | E | 1 |
| 2575 | F | 2 |
| 2580 | E | 3 |
| 2582 | E | 3 |
| 2583 | B | 4 |
| 2584 | D | 2 |
| 2585 | A | 4 |
| 2587 | E | 4 |
| 2588 | F | 4 |
| 2601 | D | 3 |
| 2602 | E | 3 |
| 2613 | B | 2 |
| 2614 | A | 2 |
| 2615 | D | 6 |
| 2616 | E | 5 |
| 2620 | B | 5 |
| 2634 | C | 1 |
| 2635 | B | 1 |
| 2636 | B | 1 |
| 2642 | B | 1 |
| 3502 | E | 3 |
| 3507 | D | 4 |
| 3523 | F | 5 |
| 3525 | F | 5 |
| 3529 | E | 2 |
| 3547 | B | 2 |
| 3548 | B | 2 |
| 3565 | B | 5 |
| 3567 | G | 2 |
| 3579 | D | 2 |
| 3582 | C | 2 |
| 3583 | C | 2 |
| 3584 | B | 3 |
| 3587 | C | 3 |
| 3589 | A | 3 |
| 3601 | E | 4 |
| 3631 | G | 2 |
| 3632 | G | 2 |
| 3635 | C | 4 |
| 3637 | C | 1 |
| 3645 | C | 4 |
| 3664 | E | 5 |
| 5501 | C | 5 |
| 5502 | G | 2 |
| 5503 | G | 2 |
| 5504 | G | 2 |
| 6501 | A | 4 |
| 6502 | A | 5 |
| 6503 | B | 3 |
| 6504 | G | 3 |
| 6510 | F | 6 |
| 6511 | F | 6 |
| 7515 | B | 4 |
| 9503 | E | 2 |
| 9505 | C | 5 |
| 9506 | E | 3 |
| 9507 | E | 2 |
| 9508 | E | 4 |
| 9509 | E | 3 |
| 9511 | E | 4 |
| 9513 | F | 6 |
| 9514 | F | 6 |
| 9515 | B | 4 |
| 9517 | F | 4 |
| 9518 | F | 5 |
| 9519 | C | 2 |
| 9520 | C | 2 |
| 9521 | B | 2 |
| 9522 | B | 2 |
| 9523 | B | 2 |
| 9524 | C | 2 |
| 9525 | D | 5 |
| 9531 | B | 5 |
| 9534 | D | 4 |
| 9536 | F | 5 |
| 9537 | F | 3 |
| 9544 | F | 6 |
| 9545 | E | 6 |
| 9546 | F | 6 |
| 9547 | E | 6 |
| 9548 | E | 6 |
| 9549 | E | 6 |
| 9551 | G | 1 |
| 9552 | D | 4 |
| 9553 | E | 4 |
| 9554 | F | 5 |
| 9560 | A | 6 |
| 9561 | B | 3 |
| 9562 | A | 3 |
| 9563 | E | 4 |
| 9566 | B | 4 |
| 9569 | A | 5 |
| 9571 | D | 2 |
| 9572 | F | 4 |
| 9573 | F | 5 |
| 9578 | C | 2 |
| 9579 | C | 6 |
| 9580 | F | 5 |
| 9581 | C | 4 |
| 9582 | D | 4 |
| 9584 | E | 2 |
| 9589 | F | 3 |
| 9590 | A | 5 |
| 9591 | G | 2 |
| 9600 | E | 6 |
| 9601 | D | 5 |

## CHIP LAYOUT



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

|  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2501 | C | 3 | 2623 | B | 4 | 3558 | C | 5 | 3652 | B | 1 |
| 2502 | F | 4 | 2624 | E | 3 | 3559 | B | 4 | 3654 | B | 1 |
| 2513 | D | 3 | 2625 | B | 2 | 3560 | B | 4 | 3655 | C | 1 |
| 2514 | E | 2 | 2630 | C | 1 | 3561 | B | 5 | 3656 | B | 1 |
| 2519 | D | 5 | 2632 | B | 1 | 3562 | C | 5 | 3657 | B | 1 |
| 2520 | D | 6 | 2637 | B | 1 | 3563 | B | 5 | 3658 | C | 1 |
| 2523 | C | 5 | 2641 | B | 4 | 3564 | C | 5 | 3661 | D | 4 |
| 2524 | E | 5 | 2643 | E | 2 | 3566 | C | 6 | 3662 | E | 4 |
| 2525 | D | 4 | 3501 | A | 4 | 3568 | G | 6 | 3663 | C | 4 |
| 2526 | E | 4 | 3503 | B | 4 | 3569 | F | 2 | 3666 | B | 1 |
| 2527 | B | 5 | 3504 | A | 4 | 3570 | F | 2 | 3667 | B | 1 |
| 2528 | C | 6 | 3505 | E | 4 | 3571 | E | 1 | 3668 | B | 1 |
| 2529 | C | 5 | 3506 | E | 4 | 3572 | E | 1 | 3671 | A | 1 |
| 2531 | B | 5 | 3508 | E | 5 | 3573 | D | 4 | 3672 | A | 1 |
| 2532 | C | 5 | 3509 | D | 4 | 3574 | E | 4 | 3673 | A | 1 |
| 2535 | D | 5 | 3510 | E | 5 | 3575 | A | 4 | 3674 | C | 1 |
| 2536 | E | 5 | 3511 | C | 4 | 3576 | A | 6 | 3675 | C | 1 |
| 2537 | E | 4 | 3512 | F | 4 | 3577 | D | 4 | 3676 | C | 1 |
| 2538 | E | 3 | 3513 | C | 3 | 3578 | D | 5 | 3677 | C | 1 |
| 2539 | D | 5 | 3514 | F | 3 | 3580 | B | 4 | 3678 | D | 1 |
| 2540 | E | 5 | 3515 | C | 3 | 3581 | E | 2 | 3679 | D | 1 |
| 2545 | E | 1 | 3516 | F | 3 | 3585 | F | 2 | 3680 | F | 1 |
| 2546 | E | 1 | 3517 | D | 3 | 3586 | F | 2 | 3681 | F | 1 |
| 2547 | G | 2 | 3518 | E | 2 | 3588 | E | 2 | 3682 | F | 1 |
| 2548 | G | 2 | 3519 | D | 4 | 3591 | B | 2 | 3907 | B | 1 |
| 2551 | D | 5 | 3520 | F | 4 | 3592 | A | 2 | 4501 | D | 3 |
| 2552 | E | 5 | 3521 | C | 4 | 3593 | E | 1 | 4502 | F | 4 |
| 2553 | G | 3 | 3522 | F | 4 | 3594 | E | 1 | 4506 | B | 6 |
| 2554 | G | 2 | 3524 | F | 4 | 3595 | F | 2 | 4508 | G | 3 |
| 2557 | G | 1 | 3526 | F | 5 | 3596 | F | 2 | 4509 | G | 3 |
| 2558 | F | 1 | 3527 | C | 4 | 3597 | A | 2 | 4510 | G | 3 |
| 2559 | D | 3 | 3528 | F | 4 | 3598 | A | 2 | 4511 | C | 1 |
| 2560 | E | 3 | 3530 | E | 2 | 3599 | B | 2 | 4512 | B | 6 |
| 2561 | D | 3 | 3531 | E | 5 | 3600 | A | 2 | 4513 | B | 4 |
| 2562 | E | 2 | 3532 | C | 5 | 3602 | E | 5 | 4514 | B | 4 |
| 2581 | D | 4 | 3533 | D | 5 | 3603 | D | 6 | 4515 | D | 5 |
| 2589 | E | 1 | 3534 | E | 5 | 3604 | E | 6 | 4517 | C | 5 |
| 2590 | E | 4 | 3535 | D | 5 | 3605 | C | 4 | 4518 | B | 5 |
| 2591 | D | 5 | 3536 | E | 5 | 3606 | F | 4 | 4519 | A | 6 |
| 2592 | E | 5 | 3537 | C | 5 | 3611 | B | 5 | 4520 | A | 4 |
| 2593 | D | 5 | 3538 | C | 5 | 3612 | B | 5 | 4521 | B | 3 |
| 2594 | E | 6 | 3539 | C | 5 | 3613 | C | 5 | 4522 | A | 6 |
| 2595 | D | 4 | 3540 | D | 5 | 3614 | F | 2 | 4523 | B | 3 |
| 2596 | E | 5 | 3541 | D | 5 | 3615 | C | 3 | 4524 | F | 4 |
| 2597 | D | 3 | 3542 | D | 6 | 3616 | F | 2 | 4525 | E | 4 |
| 2603 | E | 2 | 3543 | D | 5 | 3617 | C | 3 | 4526 | B | 5 |
| 2604 | B | 1 | 3544 | E | 5 | 3633 | C | 6 | 4527 | G | 4 |
| 2605 | D | 3 | 3545 | B | 3 | 3634 | C | 6 | 4528 | B | 6 |
| 2606 | F | 2 | 3546 | A | 3 | 3636 | C | 1 | 4529 | A | 4 |
| 2609 | F | 2 | 3549 | D | 5 | 3639 | G | 3 | 4530 | B | 5 |
| 2610 | G | 3 | 3550 | E | 5 | 3640 | G | 2 | 4531 | B | 3 |
| 2611 | B | 5 | 3551 | D | 5 | 3641 | D | 5 | 4532 | F | 6 |
| 2612 | C | 5 | 3552 | E | 5 | 3642 | E | 5 | 4533 | A | 6 |
| 2617 | D | 5 | 3553 | C | 5 | 3643 | D | 5 | 4534 | A | 6 |
| 2618 | D | 6 | 3554 | C | 5 | 3644 | E | 5 | 4535 | C | 5 |
| 2619 | E | 2 | 3555 | D | 5 | 3646 | F | 4 | 4538 | C | 6 |
| 2621 | D | 4 | 3556 | D | 5 | 3647 | C | 5 | 4539 | F | 2 |
| 2622 | E | 4 | 3557 | B | 5 | 3648 | C | 6 | 4541 | B | 6 |

## ELECTRICAL PARTSLIST AF3 BOARD

### MISCELLANEOUS

| | | |
|---|---|---|
| 1507 | 4822 265 20553 | Aux Connector |
| 1508 | 4822 267 40898 | Headphone |

### CAPACITORS

| | | |
|---|---|---|
| 2501 | 4822 122 33336 | 8.2nF 10% 50V |
| 2502 | 4822 122 33336 | 8.2nF 10% 50V |
| 2503 | 4822 124 41407 | 0.47µF 20% 63V |
| 2504 | 4822 124 41407 | 0.47µF 20% 63V |
| 2505 | 4822 124 40746 | 0.22µF 20% 63V |
| 2506 | 4822 124 40746 | 0.22µF 20% 63V |
| 2507 | 5322 121 42386 | 100nF 5% 63V |
| 2508 | 5322 121 42386 | 100nF 5% 63V |
| 2511 | 4822 121 51252 | 470nF 5% 63V |
| 2512 | 4822 121 51252 | 470nF 5% 63V |
| 2513 | 4822 122 32646 | 5.6nF 10% 50V |
| 2514 | 4822 122 32646 | 5.6nF 10% 50V |
| 2515 | 4822 124 41751 | 47µF 20% 50V |
| 2516 | 4822 124 81029 | 100µF 20% 25V |
| 2517 | 4822 121 51252 | 470nF 5% 63V |
| 2518 | 4822 121 51252 | 470nF 5% 63V |
| 2519 | 5322 122 32268 | 470pF 10% 50V |
| 2520 | 5322 122 32268 | 470pF 10% 50V |
| 2521 | 4822 124 41751 | 47µF 20% 50V |
| 2522 | 4822 124 41751 | 47µF 20% 50V |
| 2523 | 4822 122 33177 | 10nF 20% 50V |
| 2524 | 4822 122 33177 | 10nF 20% 50V |
| 2527 | 5322 122 32531 | 100pF 5% 50V |
| 2528 | 5322 122 32531 | 100pF 5% 50V |
| 2529 | 5322 122 32654 | 22nF 10% 63V |
| 2531 | 5322 122 32268 | 470pF 10% 50V |
| 2532 | 5322 122 32268 | 470pF 10% 50V |
| 2533 | 4822 121 51252 | 470nF 5% 63V |
| 2534 | 4822 121 51252 | 470nF 5% 63V |
| 2535 | 4822 122 33219 | 1.8nF 10% 50V |
| 2536 | 4822 122 33219 | 1.8nF 10% 50V |
| 2537 | 5322 122 32531 | 100pF 5% 50V |
| 2538 | 5322 122 32531 | 100pF 5% 50V |
| 2539 | 4822 122 33891 | 3.3nF 10% 63V |
| 2540 | 4822 122 33891 | 3.3nF 10% 63V |
| 2541 | 4822 124 41751 | 47µF 20% 50V |
| 2542 | 4822 124 41751 | 47µF 20% 50V |
| 2543 | 4822 124 41751 | 47µF 20% 50V |
| 2544 | 4822 124 41751 | 47µF 20% 50V |
| 2545 | 5322 122 32268 | 470pF 10% 50V |

### CAPACITORS

| | | |
|---|---|---|
| 2546 | 5322 122 32268 | 470pF 10% 50V |
| 2547 | 5322 122 32654 | 22nF 10% 63V |
| 2549 | 4822 124 40246 | 4.7µF 20% 50V |
| 2550 | 4822 124 40246 | 4.7µF 20% 50V |
| 2551 | 5322 122 32268 | 470pF 10% 50V |
| 2552 | 5322 122 32268 | 470pF 10% 50V |
| 2557 | 5322 122 32654 | 22nF 10% 63V |
| 2558 | 5322 122 32654 | 22nF 10% 63V |
| 2559 | 5322 122 32531 | 100pF 5% 50V |
| 2560 | 5322 122 32531 | 100pF 5% 50V |
| 2561 | 5322 122 34123 | 1nF 10% 50V |
| 2562 | 5322 122 34123 | 1nF 10% 50V |
| 2573 | 4822 124 40246 | 4.7µF 20% 50V |
| 2574 | 4822 124 40246 | 4.7µF 20% 50V |
| 2575 | 4822 124 40246 | 4.7µF 20% 50V |
| 2580 | 4822 124 41751 | 47µF 20% 50V |
| 2581 | 4822 122 33177 | 10nF 20% 50V |
| 2582 | 4822 124 41751 | 47µF 20% 50V |
| 2583 | 4822 124 81029 | 100µF 20% 25V |
| 2584 | 4822 124 81029 | 100µF 20% 25V |
| 2585 | 4822 124 41751 | 47µF 20% 50V |
| 2587 | 4822 124 40246 | 4.7µF 20% 50V |
| 2588 | 4822 124 40246 | 4.7µF 20% 50V |
| 2589 | 4822 126 13838 | 100nF +80%/-20% 50V |
| 2590 | 5322 122 32658 | 22pF 5% 50V |
| 2591 | 4822 126 13838 | 100nF +80%/-20% 50V |
| 2592 | 4822 126 13838 | 100nF +80%/-20% 50V |
| 2593 | 4822 122 33575 | 220pF 5% 50V |
| 2594 | 4822 122 33575 | 220pF 5% 50V |
| 2597 | 4822 126 13838 | 100nF +80%/-20% 50V |
| 2601 | 4822 124 40246 | 4.7µF 20% 50V |
| 2602 | 4822 124 40246 | 4.7µF 20% 50V |
| 2603 | 5322 122 32531 | 100pF 5% 50V |
| 2609 | 5322 122 32531 | 100pF 5% 50V |
| 2610 | 5322 122 32531 | 100pF 5% 50V |
| 2611 | 5322 122 32658 | 22pF 5% 50V |
| 2612 | 5322 122 32658 | 22pF 5% 50V |
| 2615 | 4822 124 40246 | 4.7µF 20% 50V |
| 2616 | 4822 124 40246 | 4.7µF 20% 50V |
| 2617 | 5322 122 34123 | 1nF 10% 50V |

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## ELECTRICAL PARTSLIST AF3 BOARD

### CAPACITORS

| | | |
|---|---|---|
| 2618 | 5322 122 34123 | 1nF 10% 50V |
| 2620 | 4822 124 40433 | 47µF 20% 25V |
| 2621 | 5322 122 32658 | 22pF 5% 50V |
| 2622 | 5322 122 32658 | 22pF 5% 50V |
| 2623 | 5322 126 10223 | 4.7nF 10% 63V |
| 2624 | 5322 126 10794 | 220pF 5% 63V |
| 2641 | 4822 122 33175 | 22nF 20% 50V |

### RESISTORS

| | | |
|---|---|---|
| 3501 | 4822 051 20101 | 100R 1% 0.1W |
| 3502 | 4822 116 52175 | 100R 1% 0.5W |
| 3503 | 4822 051 20562 | 5k6 5% 0.1W |
| 3504 | 4822 051 20562 | 5k6 5% 0.1W |
| 3505 | 4822 051 20332 | 3k3 5% 0.1W |
| 3506 | 4822 051 20332 | 3k3 5% 0.1W |
| 3511 | 4822 051 20223 | 22k 5% 0.1W |
| 3512 | 4822 051 20223 | 22k 5% 0.1W |
| 3513 | 4822 051 20222 | 2k2 5% 0.1W |
| 3514 | 4822 051 20222 | 2k2 5% 0.1W |
| 3515 | 4822 051 20472 | 4k7 5% 0.1W |
| 3516 | 4822 051 20472 | 4k7 5% 0.1W |
| 3517 | 4822 051 20472 | 4k7 5% 0.1W |
| 3518 | 4822 051 20472 | 4k7 5% 0.1W |
| 3523 | 4822 116 52303 | 8k2 5% 0.5W |
| 3524 | 4822 116 52303 | 8k2 5% 0.1W |
| 3527 | 4822 116 52256 | 2k2 5% 0.5W |
| 3528 | 4822 117 11449 | 2k2 1% 0.5W |
| 3531 | 4822 051 20562 | 5k6 5% 0.1W |
| 3532 | 4822 051 20562 | 5k6 5% 0.1W |
| 3533 | 4822 051 20684 | 680k 5% 0.1W |
| 3534 | 4822 051 20684 | 680k 5% 0.1W |
| 3535 | 4822 051 20224 | 220k 5% 0.5W |
| 3536 | 4822 051 20224 | 220k 5% 0.5W |
| 3537 | 4822 117 10833 | 10k 5% 0.1W |
| 3538 | 4822 117 10833 | 10k 5% 0.1W |
| 3539 | 4822 117 10833 | 10k 5% 0.1W |
| 3540 | 4822 117 10833 | 10k 5% 0.1W |
| 3541 | 4822 051 20822 | 8k2 5% 0.1W |
| 3542 | 4822 051 20822 | 8k2 5% 0.1W |
| 3543 | 4822 051 20473 | 47k 5% 0.1W |
| 3544 | 4822 051 20473 | 47k 5% 0.1W |
| 3545 | 4822 051 20562 | 5k6 5% 0.1W |
| 3546 | 4822 051 20562 | 5k6 5% 0.1W |
| 3547 | 4822 116 83864 | 10k 5% 0.5W |

### RESISTORS

| | | |
|---|---|---|
| 3548 | 4822 116 52256 | 2k2 5% 0.5W |
| 3549 | 4822 051 20562 | 5k6 5% 0.1W |
| 3550 | 4822 051 20562 | 5k6 5% 0.1W |
| 3551 | 4822 051 20822 | 8k2 5% 0.1W |
| 3552 | 4822 051 20822 | 8k2 5% 0.1W |
| 3553 | 4822 051 10102 | 1k 2% 0.25W |
| 3554 | 4822 051 10102 | 1k 2% 0.25W |
| 3555 | 4822 051 20821 | 820R 5% 0.1W |
| 3556 | 4822 051 20821 | 820R 5% 0.1W |
| 3557 | 4822 051 20273 | 27k 5% 0.1W |
| 3558 | 4822 051 20273 | 27k 5% 0.1W |
| 3559 | 4822 051 20822 | 8k2 5% 0.1W |
| 3559 | 4822 051 20333 | 33k 5% 0.1W (FW373C) |
| 3560 | 4822 051 20822 | 8k2 5% 0.1W |
| 3560 | 4822 051 20333 | 33k 5% 0.1W (FW373C) |
| 3561 | 4822 051 20273 | 27k 5% 0.1W |
| 3562 | 4822 117 11449 | 2k2 5% 0.1W |
| 3563 | 4822 051 20154 | 150k 5% 0.1W |
| 3564 | 4822 051 20154 | 150k 5% 0.1W |
| 3565 | 4822 116 52195 | 47Ω 5% 0.5W |
| 3566 | 4822 051 20479 | 47Ω 5% 0.1W |
| 3567 | 4822 051 20479 | 47Ω 5% 0.1W |
| 3568 | 4822 051 20479 | 47Ω 5% 0.1W |
| 3569 | 4822 051 10102 | 1k 2% 0.25W |
| 3570 | 4822 051 10102 | 1k 2% 0.25W |
| 3571 | 4822 117 11149 | 82k 5% 0.1W |
| 3572 | 4822 117 11149 | 82k 5% 0.1W |
| 3573 | 4822 051 20221 | 220R 5% 0.1W |
| 3574 | 4822 051 20221 | 220R 5% 0.1W |
| 3575 | 4822 051 20228 | 2Ω2 5% 0.1W |
| 3577 | 4822 051 10332 | 3k3 2% 0.25W |
| 3578 | 4822 051 10332 | 3k3 2% 0.25W |
| 3579 | 4822 116 83864 | 10k 5% 0.1W |
| 3580 | 4822 117 11139 | 1k5 5% 0.1W |
| 3581 | 4822 116 83864 | 10k 5% 0.5W |
| 3582 | 4822 050 11002 | 1k 1% 0.4W |
| 3583 | 4822 050 11002 | 1k 1% 0.4W |
| 3584 | 4822 050 24705 | 4M7 1% 0.6W |
| 3585 | 4822 051 20472 | 4k7 5% 0.1W |
| 3586 | 4822 051 10102 | 1k 2% 0.25W |

### RESISTORS

| | | |
|---|---|---|
| 3589 | 4822 116 52244 | 15k 5% 0.5W |
| 3593 | 4822 051 10102 | 1k 2% 0.25W |
| 3594 | 4822 051 10102 | 1k 2% 0.25W |
| 3595 | 4822 051 20562 | 5k6 5% 0.1W |
| 3601 | 4822 116 52297 | 68k 5% 0.1W |
| 3602 | 4822 226 52297 | 68k 5% 0.1W |
| 3603 | 4822 117 11139 | 1k5 5% 0.1W |
| 3604 | 4822 117 11139 | 1k5 5% 0.1W |
| 3611 | 4822 051 20392 | 3k9 5% 0.1W |
| 3612 | 4822 051 20472 | 4k7 5% 0.1W |
| 3613 | 4822 051 20821 | 820R 5% 0.1W |
| 3631 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3632 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3633 | 4822 051 20224 | 220k 5% 0.1W |
| 3634 | 4822 051 20224 | 220k 5% 0.1W |
| 3635 | 4822 052 10109 | 10Ω 5% 0.33W |
| 3641 | 4822 051 20562 | 5k6 5% 0.1W |
| 3643 | 4822 051 20822 | 8k2 5% 0.1W |
| 3644 | 4822 051 20822 | 8k2 5% 0.1W |
| 3645 | 4822 116 83883 | 470R 5% 0.5W (FW373C) |
| 3646 | 4822 116 83883 | 470R 5% 0.5W (FW373C) |

### CHIP JUMPER

| | | |
|---|---|---|
| 4501 | 4822 051 20008 | 0Ω Jumper (Not for -/21) |
| 4503 | 4822 051 20008 | 0Ω Jumper |
| 4504 | 4822 051 20008 | 0Ω Jumper |
| 4505 | 4822 051 20008 | 0Ω Jumper |
| 4506 | 4822 051 20008 | 0Ω Jumper |
| 4507 | 4822 051 20008 | 0Ω Jumper |
| 4508 | 4822 051 20008 | 0Ω Jumper |
| 4509 | 4822 051 20008 | 0Ω Jumper |
| 4510 | 4822 051 20008 | 0Ω Jumper |
| 4512 | 4822 051 20008 | 0Ω Jumper |
| 4513 | 4822 051 20008 | 0Ω Jumper |
| 4514 | 4822 051 20008 | 0Ω Jumper |
| 4515 | 4822 051 20008 | 0Ω Jumper |
| 4518 | 4822 051 20008 | 0Ω Jumper |
| 4517 | 4822 051 20008 | 0Ω Jumper |
| 4519 | 4822 051 20008 | 0Ω Jumper |
| 4520 | 4822 051 20008 | 0Ω Jumper |
| 4522 | 4822 051 20008 | 0Ω Jumper |
| 4523 | 4822 051 20008 | 0Ω Jumper |
| 4524 | 4822 051 20008 | 0Ω Jumper |
| 4525 | 4822 051 20008 | 0Ω Jumper |
| 4526 | 4822 051 20008 | 0Ω Jumper |
| 4528 | 4822 051 20008 | 0Ω Jumper |
| 4529 | 4822 051 20008 | 0Ω Jumper |
| 4531 | 4822 051 20008 | 0Ω Jumper |
| 4532 | 4822 051 20008 | 0Ω Jumper |
| 4533 | 4822 051 20008 | 0Ω Jumper |
| 4534 | 4822 051 20008 | 0Ω Jumper |
| 4535 | 4822 051 20008 | 0Ω Jumper |
| 4545 | 4822 051 20008 | 0Ω Jumper |
| 4546 | 4822 051 20008 | 0Ω Jumper |
| 4551 | 4822 051 20008 | 0Ω Jumper |
| 4572 | 4822 051 20008 | 0Ω Jumper |
| 4573 | 4822 051 20008 | 0Ω Jumper |
| 4574 | 4822 051 20008 | 0Ω Jumper |
| 4575 | 4822 051 20008 | 0Ω Jumper |
| 4576 | 4822 051 20008 | 0Ω Jumper |
| 4577 | 4822 051 20008 | 0Ω Jumper |
| 4580 | 4822 051 20008 | 0Ω Jumper |

### DIODES

| | | |
|---|---|---|
| 6501 | 4822 130 34382 | BZX79-C8V2 |

### INTERGRATED CIRCUITS

| | | |
|---|---|---|
| 7501 | 4822 209 31378 | NJM4556AM |
| 7506 | 4822 209 63709 | LM324D |
| 7507 | 4822 209 83357 | NJM4560M (-/21) |
| 7553 | 4822 209 33652 | TEA6321T/V1 |

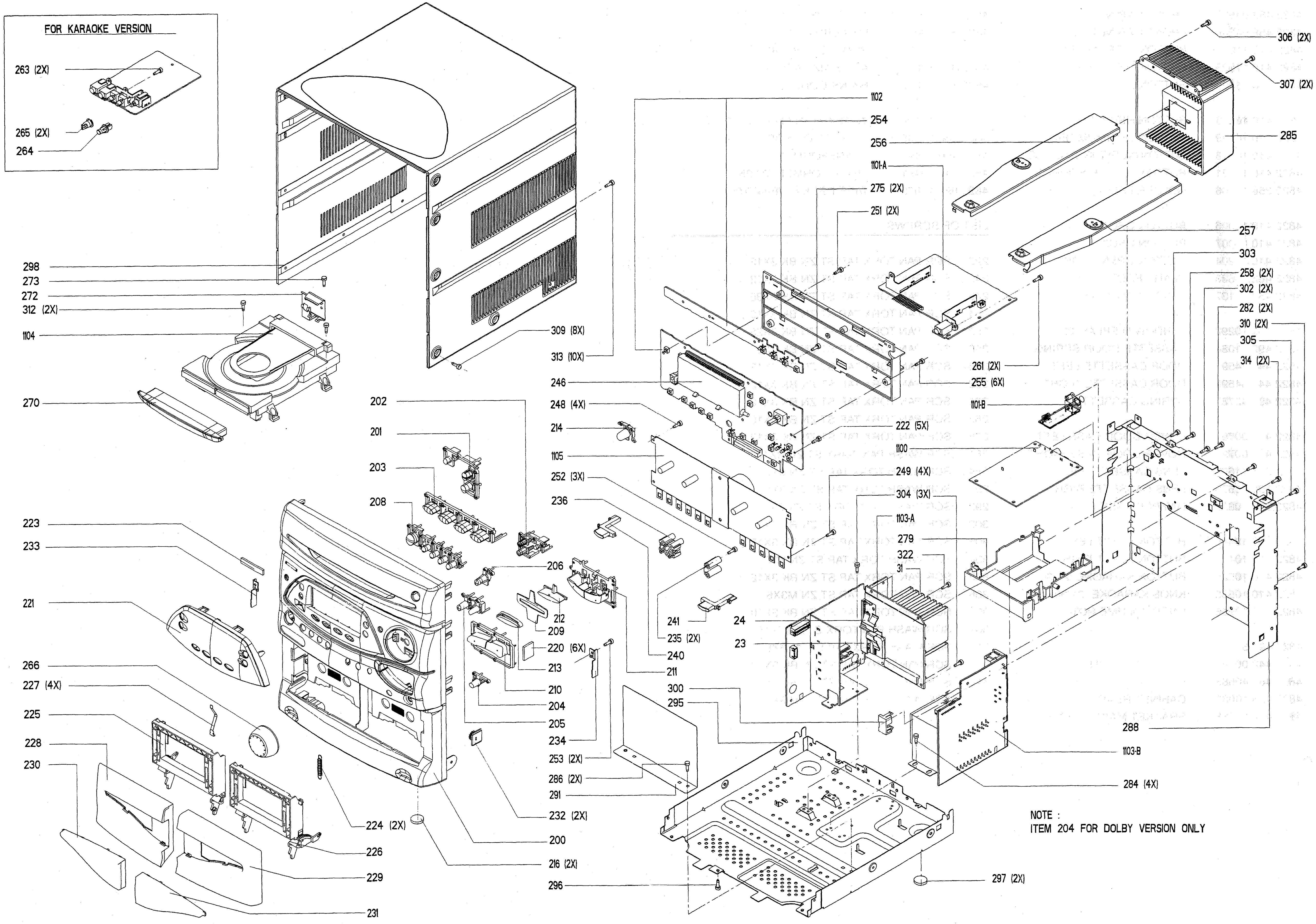
### TRANSISTORS

| | | |
|---|---|---|
| 7503 | 4822 130 42615 | BC817-40 |
| 7504 | 4822 130 42615 | BC817-40 |
| 7505 | 5322 130 42136 | BC848C |
| 7508 | 5322 130 42136 | BC848C |
| 7512 | 5322 130 42136 | BC848C |
| 7513 | 5322 130 42136 | BC848C |
| 7514 | 5322 130 41983 | BC858B |
| 7515 | 4822 130 41327 | BC327-40 |
| 7516 | 5322 130 42136 | BC848C |

### COILS

| | | |
|---|---|---|
| 5501 | 4822 156 21721 | COIL 2.2μH |
| 5502 | 4822 156 21721 | COIL 2.2μH |
| 5503 | 4822 156 21721 | COIL 2.2μH |
| 5504 | 4822 156 21721 | COIL 2.2μH |

# EXPLODED VIEW OF SET


FOR KARAOKE VERSION
263 (2X)
265 (2X)
264
298
273
272
312 (2X)
1104
270
223
233
221
266
227 (4X)
225
228
230
202
201
203
208
206
212
209
220 (6X)
213
210
204
205
234
253 (2X)
286 (2X)
291
232 (2X)
200
216 (2X)
296
224 (2X)
226
229
231
309 (8X)
313 (10X)
246
248 (4X)
214
1105
252 (3X)
236
241
235 (2X)
240
211
300
295
1102
254
256
1101-A
275 (2X)
251 (2X)
261 (2X)
255 (6X)
1101-B
222 (5X)
1100
249 (4X)
304 (3X)
1103-A
279
322
31
24
23
288
1103-B
284 (4X)
297 (2X)
306 (2X)
307 (2X)
285
257
303
258 (2X)
302 (2X)
282 (2X)
310 (2X)
305
314 (2X)

NOTE :
ITEM 204 FOR DOLBY VERSION ONLY

## MECHANICAL PARTLIST

| | | |
|---|---|---|
| 200 | 4822 459 04512 | FRONT CABINET /21 |
| 200 | 4822 459 04504 | FRONT CABINET /22/25 |
| 201 | 4822 410 11027 | BUTTON DISPLAY LEFT |
| 202 | 4822 410 11028 | BUTTON DISPLAY RIGHT |
| 203 | 4822 410 11029 | BUTTON DISPLAY CENTRE |
| 204 | 4822 410 10198 | BUTTON HSD /22 |
| 205 | 4822 410 10199 | BUTTON OPTIMUM/DBB |
| 206 | 4822 410 10418 | BUTTON INCREDIBLE SOUND |
| 208 | 4822 410 11031 | BUTTON POWER/SOURCE |
| 209 | 4822 256 10206 | HOLDER LED |
| 210 | 4822 410 11006 | BUTTON DSC1 |
| 211 | 4822 410 11007 | BUTTON DSC2 |
| 214 | 4822 410 10204 | BUTTON OPEN/CLOSE |
| 216 | 4822 462 40683 | PLATE (FOOT) |
| 221 | 4822 450 10137 | WINDOW DISPLAY |
| 221 | 4822 450 10292 | WINDOW DISPLAY /22 |
| 224 | 4822 492 11086 | CASSETTE DOOR SPRING |
| 225 | 4822 443 64597 | DOOR CASSETTE LEFT |
| 226 | 4822 443 64598 | DOOR CASSETTE RIGHT |
| 227 | 4822 492 42787 | SPRING CASSETTE |
| 228 | 4822 442 00797 | COVER DOOR CASS LEFT |
| 229 | 4822 442 00798 | COVER DOOR CASS RIGHT |
| 230 | 4822 381 11672 | LENS CASSETTE LEFT |
| 231 | 4822 381 11673 | LENS CASSETTE RIGHT |
| 232 | 4822 529 10322 | DAMPER ASSY |
| 240 | 4822 410 10425 | BUTTON EJECT LEFT |
| 241 | 4822 410 10426 | BUTTON EJECT RIGHT |
| 264 | 4822 410 10535 | BUTTON KARAOKE /21/30 |
| 265 | 4822 410 10533 | KNOB KARAOKE /21/30 |
| 266 | 4822 410 10966 | KNOB VOLUME ROTARY |
| 267 | 4822 492 51374 | RING |
| 270 | 4822 442 00799 | COVER TRAY CDC |
| 297 | 4822 462 40683 | PLATE (FOOT) |
| 298 | 4822 426 10069 | CABINET REAR |
| 300 | 4822 402 10288 | BRACKET MAINS SOCKET |

## MISCELLANEOUS

| | |
|---|---|
| 4822 445 10623 | 1X LOUDSPEAKER BOX |
| 4822 303 50063 | FM AERIAL |
| 4822 218 10195 | REMOTE CONTROL |
| 4822 303 50082 | AM FRAME AERIAL |
| 4822 321 10249 | MAINS CORD /21/22 |
| 4822 736 15109 | INTRUCTION FOR USE /21/30 |
| 4822 736 15108 | INTRUCTION FOR USE /34 |
| 4822 146 10492 | TRANSFORMER /21 |
| 4822 146 10491 | TRANSFORMER /22/25 |
| 4822 691 10579 | TAPE DECK CWB44FF06 |

## LIST OF SCREWS

| | |
|---|---|
| 222 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 248 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 249 | SCR PAN TORX TAP ST ZN BK 3X30 |
| 251 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 252 | SCR PAN TORX TAP ST ZN BK 3X25 |
| 253 | SCR PAN TORX TAP ST ZN BK 3X8 |
| 255 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 258 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 261 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 263 | SCR PAN TORX TAP ST ZN BK 3X10 |
| 275 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 281 | SCR WASH PAN TORX ST ZN 3X12 |
| 284 | SCR WASH TORX TAP ST ZN 3X6 |
| 292 | SCR WASH TORX TAP ST ZN 3X6 |
| 293 | SCR WASH PAN TORX ST ZN 3X10 |
| 302 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 303 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 304 | SCR WASH TORX TAP ST ZN 3X6 |
| 305 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 306 | SCR PAN TORX TAP ST ZN M3X6 |
| 307 | SCR PAN TORX TAP ST ZN BK 3X10 |
| 308 | SCR WASH PAN TORX ST ZN 3X16 |
| 310 | SCR WASH TORX TAP ST ZN 3X6 |
| 311 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 312 | SCR PAN TORX TAP ST ZN BK 3X12 |
| 313 | SCR WASH TORX TAP ST ZN 3X10 |